Technology Review

Edited at the Massachusetts Institute of Technology

February, 1965

Response to a Nobel Award, page 22

technology
review
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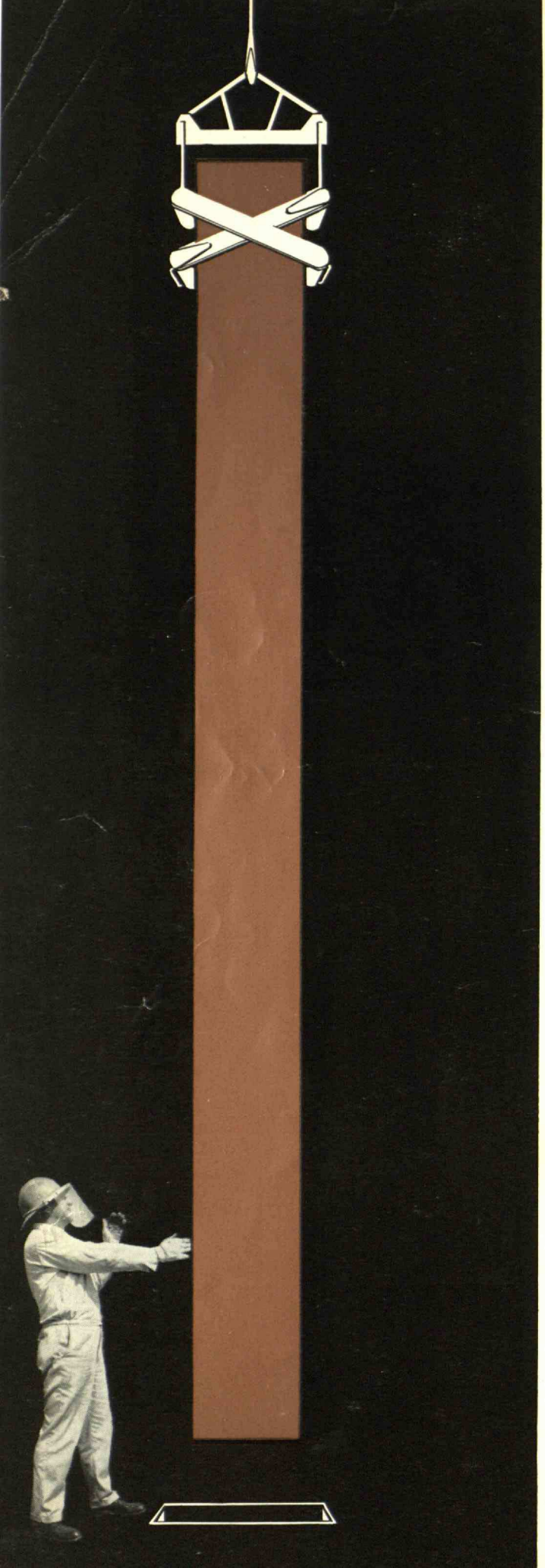

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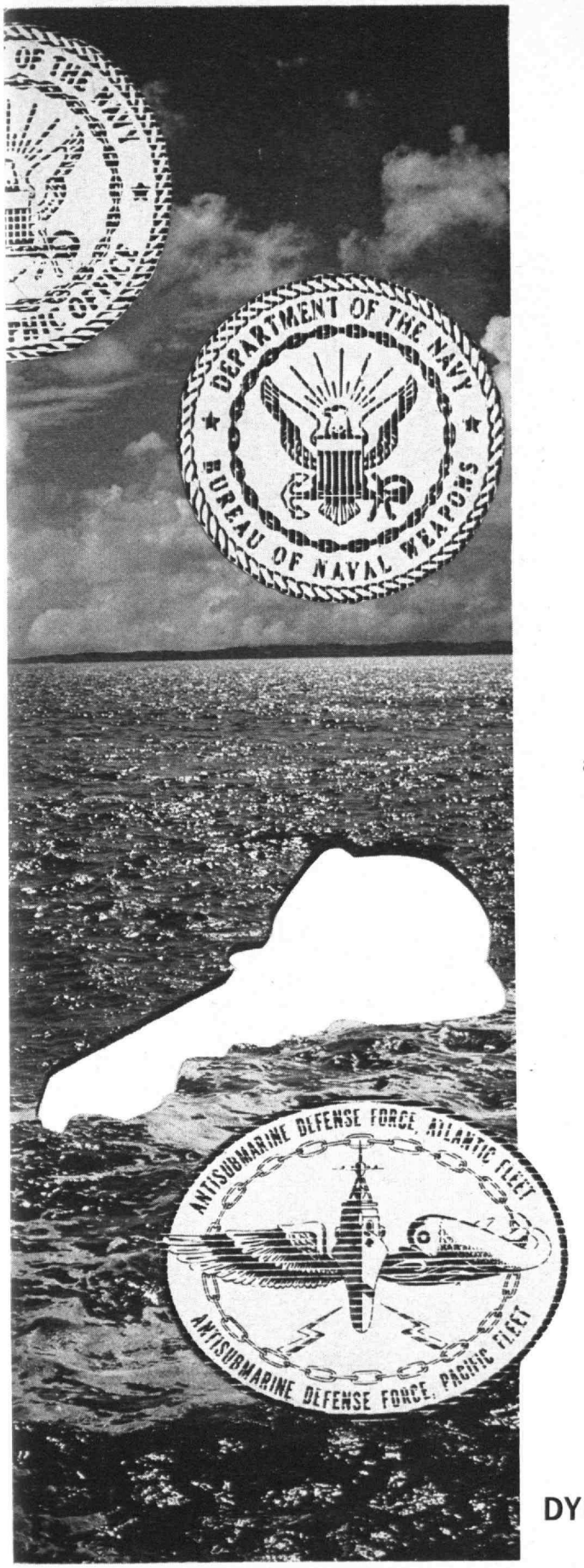

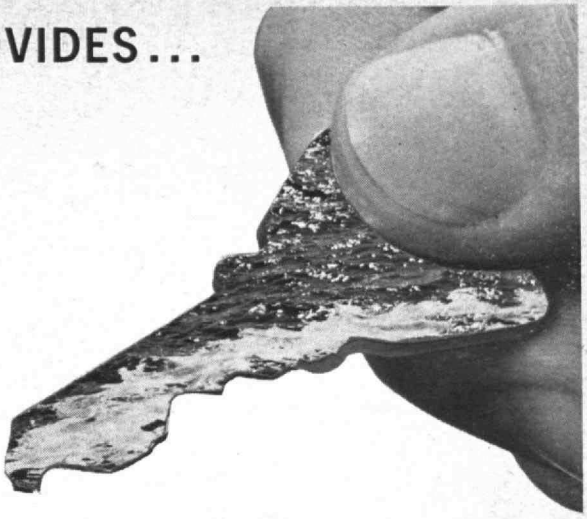

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Reg. U.S. Patent Office

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THE COVER *shows King Gustaf VI Adolf of Sweden presenting the 1964 Nobel Award in Physics to Provost Charles H. Townes in Stockholm on December 10. The three ladies in the foreground are (from left) Princess Christina, Queen Louise, and Princess Sibylla. For additional pictures of the ceremony and Dr. Townes's response to the award,* *please turn to pages 22 and 23.*

Midwinter Book Browsing

News of the M.I.T. Community

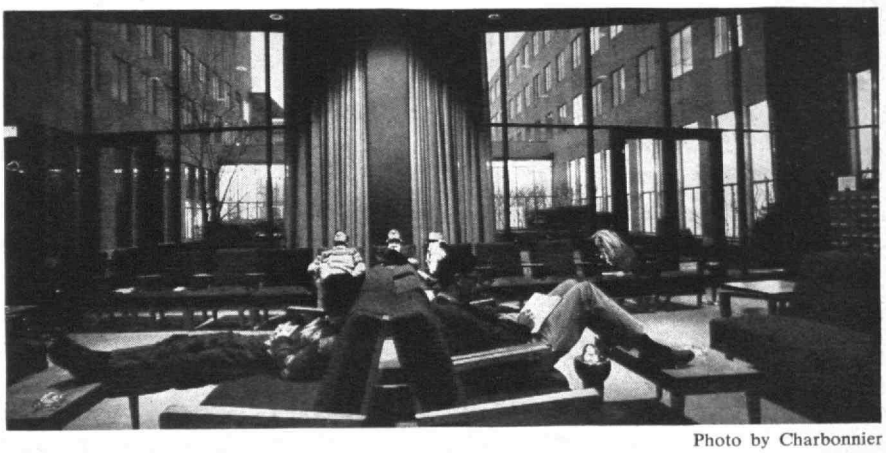

Photo by Charbonnier

The Music Room on the first floor of Hayden Library on a sunny afternoon.

Individuals Noteworthy

Engineering Academy

AUGUSTUS B. KINZEL, '21, is president of the newly created National Academy of Engineering, and founding members include President Julius A. Stratton, '23, and Professors Antoine M. Gaudin and Thomas K. Sherwood, '24.

Augustus B. Kinzel, '21

The new academy is a part of the older National Academy of Sciences and will operate on "an autonomous and parallel but co-ordinated basis," to serve the needs of the federal government for responsible advice.

The Gardner Lecturer

SIR B. MELVILL JONES will give this year's Lester D. Gardner ('98) Lecture in the Little Theater of Kresge Auditorium at 3:30 P.M. on March 23.

Sir Melvill was one of the pioneers in aircraft aerodynamics, stability, and armament, and for many years was Francis Mond Professor of Aeronautical Engineering in Emmanuel College of Cambridge University. He is a Fellow of the Royal Society and an Honorary Fellow of the Royal Aeronautical Society.

In Sloan Fellows Chair

ELTING E. MORISON has been appointed to succeed the late Professor Douglas McGregor as the Sloan Fellows Professor of Industrial Management, a chair established in 1962 by the Society of Sloan Fellows at M.I.T.

Professor Morison came to the Institute in 1946 and since 1953 has been professor of Industrial history. His books include *Admiral Sims and the Modern American Navy,* and a biography of Henry L. Stimson, *Turmoil and Tradition,* which won the Parkman Prize of the Society of American Historians.

He became a consultant to Educational Services, Inc., in 1962 to act as chairman of the planning committee assigned to redesign the social studies curriculum for primary and secondary schools. The first unit of this new curriculum was put into experimental use in eight schools in 1963, and additional units are now being developed.

Professor Morison was also a consultant for five years to the Houghton Mifflin Company and for six years to the Research and Development Board of the U.S. Department of Defense. In 1962 he was vice-president of the Edward MacDowell Association, the parent organization of the MacDowell Colony in Peterborough, N. H.

Associate Librarian

MYER M. KESSLER, '39, became associate director of libraries at M.I.T. on January 1. He succeeds Richard L. Snyder, who has become director of libraries at the Drexel Institute of Technology in Philadelphia.

Dr. Kessler will continue to direct the Technical Information Project and work closely with the staff analyzing procedures which can best be mechanized to improve library service to the M.I.T. community. Dr. Kessler worked in the M.I.T. Radiation Laboratory, at the Bureau of Standards, and Lincoln Laboratory before joining the M.I.T. Libraries staff.

Ford Professor

JAMES C. KECK, an authority on molecular radiation and chemical kinetics, will become Ford professor of engineering at M.I.T. next July 1.

Dr. Keck has been with the AVCO-Everett Research Laboratory since 1955 with general responsibility for its atomic physics work, and has conducted experimental and theoretical investigations there of shock-heated gases. As Ford Professor of Engineering he will establish a Laboratory for Atomic and Molecular Kinetics at the Institute and work closely with Faculty and students in the fields of fluid mechanics and energy conversion.

Dean Gordon S. Brown, '31, said the decision to establish such a laboratory within the engineering school illustrates the growing importance of fundamental science to practical engineering developments. He described the dependence of engineering on fundamental science as a hallmark of the explosion in contemporary technology. Most of the spectacular engineering advances of the past two decades have involved the prompt translation of fundamental discoveries in the basic sciences into practical devices.

A native of New York City, Dr. Keck went to Cornell University and received his doctorate there in 1951. From 1952 to 1955 he was a senior research fellow at the California Institute of Technology. At both institutions he worked on nuclear physics problems.

Honors to Alumni

RECIPIENTS of recent awards and similar distinctions have included:

Oscar H. Horovitz, '22, a Fine Work Prize for the film "Gateway of India" by the Society for International Cultural Relations, Tokyo . . . *Harold E. Edgerton, '27,* the 1964 Silver Progress Medal by the Royal Photographic Society of Great Britain . . . *Robert H. Winters, '33,* the 1964 National Human Relations Award by the Canadian Council of Christians and Jews;

Lieutenant Colonel Edward H. Peterson, '44, Oak Cluster, to the Commendation Medal, U.S. Air Force . . . *Ju Chin Chu, '46,* as Academician, Academia Sinica, Free China.

(*Continued on page 6*)

The man who came to luncheon . . . 49 floors up

EDWARD V. HICKEY, Public Relations Director of New England Merchants National Bank, enjoys a quick lunch on the unfinished 49th floor of the Prudential Tower where, this spring, our Bank's main office staff will be dining every day.

OUR BANK IS ALSO BUSY on the plans to provide for meeting and conference rooms of various sizes on this "high level" 49th floor. In effect, this area will be part of our three-story Main Office covering a ground space the size of a football field at the base of the Tower.

WHEN OUR BANK PREMISES are completely finished, we promise to update this welcome with an invitation to all of you to drop in and see for yourselves what's new at New England Merchants National Bank.

WHERE THE MAN YOU TALK TO IS THE BANK

NEW ENGLAND MERCHANTS
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Individuals Noteworthy

(*Continued from page 4*)

Erwin H. Schell: 1889-1965

ERWIN HASKELL SCHELL, '12, Professor Emeritus of Industrial Management and a pioneer in management education, died January 3 after a long illness. In 38 years of teaching he helped to shape the careers of hundreds of students who later became national figures in business and industry.

Professor Schell taught at M.I.T. from 1917 until his retirement in 1955. Annually he gave a special lecture for seniors which dealt with the personal attributes required for a successful career in business. The lecture came to be known as "Professor Schell's Million Dollar Lecture."

On his retirement, a tabulation showed that among his former students were 130 corporation presidents and 232 others who were partners in firms, owners of businesses, and company vice-presidents, treasurers, and secretaries.

Professor Schell was born in Kalamazoo, Mich., on September 29, 1889, and was graduated from M.I.T. in 1912 with an S.B. degree in mechanical engineering. After graduation he was associated with industry until he joined the M.I.T. Faculty. He was appointed associate professor in 1926 and professor in 1929.

M.I.T. established its Course in Business and Engineering Administration as a separate department in 1930 and Professor Schell became permanent department head in 1931. That year he also obtained support for inaugurating an executive development program, of the type now common to most U.S. schools of management.

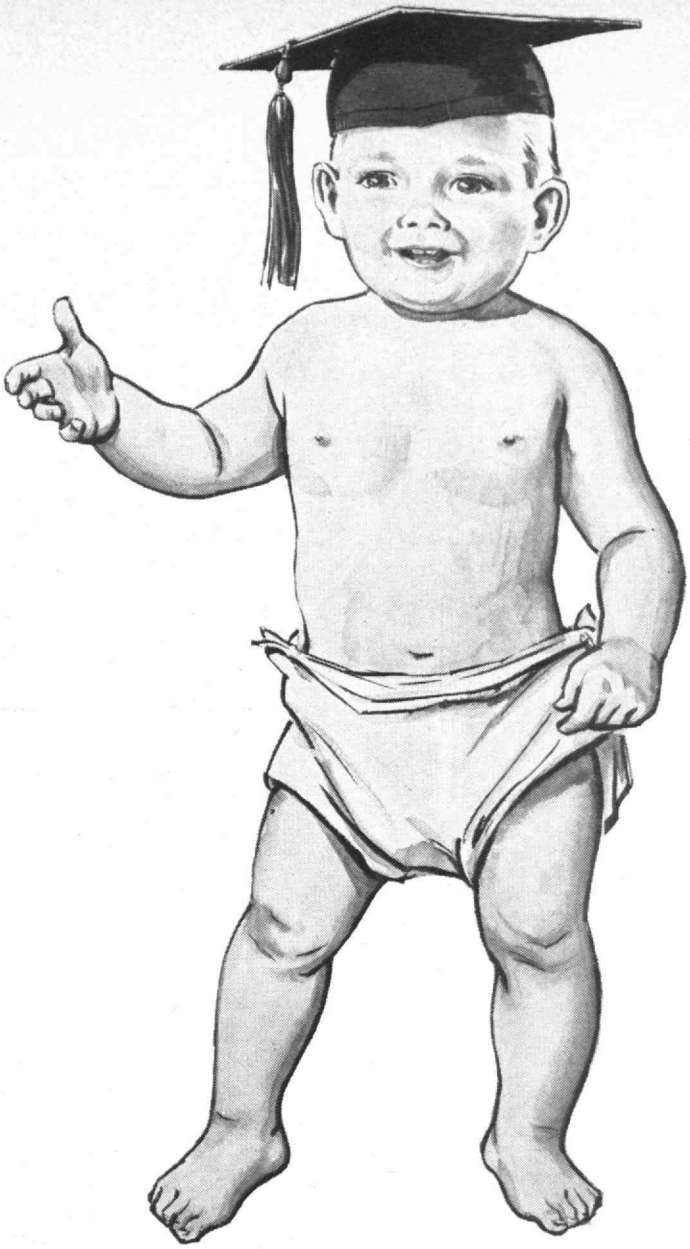
Erwin H. Schell, '12

Although not a sailor, he was instrumental in establishing dinghy sailing at the Institute and helped raise the money for the dinghy fleet and the Tech Sailing Pavilion.

Professor Schell's many books include *The Technique of Executive Control* (1924), which was a standard reference in management. He was the first chancellor of the International Academy of Management, and his many awards include the Wallace Clark Medal of the National Management Council.

He is survived by Mrs. Schell; a son, Dr. E. Haskell Schell, Jr.; a daughter, Mrs. W. H. Prosser, and five grandchildren.

(*Continued on page 8*)



Business, shake hands with your future!

Business is facing real competition today—tomorrow it will be no easier.

You will have to develop advantages—in product, in service, in operating costs.

You'll need leaders. They'll provide ideas and initiative in research and development, distribution and sales, financial management and every other department of your business.

Where will these leaders come from?

From higher education, mostly. Business is the biggest user of the college product. A recent executive survey made of 100 manufacturing businesses revealed that of the 200 top executives, 86% were college-educated.

But our colleges are facing problems. They need facilities, yes. But even more urgent is the demand for competent teachers. This is the human equation that will help America develop and maintain a higher *margin of excellence.*

It's everybody's job, but the business community has the largest stake. College is business' best friend. Give to the college of your choice—keep our leaders coming.

Individuals Noteworthy

(Continued from page 6)

W. B. Nottingham: 1899-1964

PROFESSOR EMERITUS Wayne B. Nottingham died on December 4 in Aerdenhout, Holland. Professor and Mrs. Nottingham were touring Europe following a series of lectures he had delivered last fall.

Professor Nottingham was a leading authority on physical electronics and thermionics. In 1935 he organized and conducted the First M.I.T. Physical Electronics Conference which provided a unique forum for the exchange of information in this special field. These conferences have been held annually at M.I.T. each spring except for the World War II years.

Born in Tipton, Ind., Professor Nottingham was graduated from Purdue University in 1920. The following year he studied at the University of Uppsala, Sweden, as a Benjamin Franklin Fellow of the American-Scandinavian Foundation, and upon his return to the United States he joined the staff of the Bell Telephone Laboratories. He then continued his graduate education at Princeton University where he received his doctorate in 1929, having done his thesis on metallic arcs under Karl Compton. He also was awarded the degree of Electrical Engineer in 1929 by Purdue, and from 1926 to 1931 he was a Bartol Research Fellow of the Franklin Institute. He joined the M.I.T. Faculty in 1931.

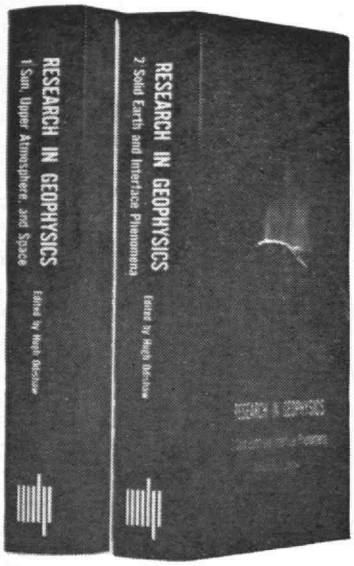
Dr. Nottingham contributed more than 50 papers and articles to symposia and journals and developed a number of electronic measuring devices. During World War II, he was a special representative of the M.I.T. Radiation Laboratory to the Office of Scientific Research and Development in Washington. A Fellow of the American Academy of Arts and Sciences, he was also a member of the Institute of Electrical and Electronics Engineers, the Optical Society of America, the American Physical Society, Eta Kappa Nu, and Sigma Xi. He held the Louis E. Levy Award of the Franklin Institute.

He is survived by his wife, and a son, Marsh W. Nottingham, '56, of Roswell, N.M.

(Continued on page 36)

RESEARCH IN GEOPHYSICS

Volume 1: *Sun, Upper Atmosphere, and Space;* Volume II: *Solid Earth and Interface Phenomena.* Edited by HUGH ODISHAW. This major work offers a critical review of research and progress in the prime areas of the geophysical sciences, with emphasis on the findings of the past decade. Each of the forty-three chapters is contributed by a recognized authority in his field. Vol. I: 592 pages, Vol. II: 608 pages; 530 illustrations and tables; $12.50 each volume, $25.00 the set



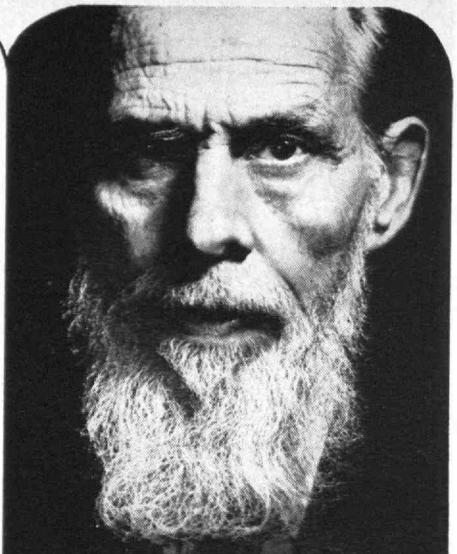
THE TECHNOLOGY OF NUCLEAR REACTOR SAFETY

PUBLISHED UNDER THE SPONSORSHIP OF THE ATOMIC ENERGY COMMISSION.

Volume I: *Reactor Physics and Control*
Volume II: *Reactor Materials and Engineering.*

Edited by T. J. THOMPSON and J. G. BECKERLEY.

The starting idea for this work derives from a letter written by the Advisory Committee on Reactor Safeguards of the A.E.C. which suggested "a twenty-five man-year effort" to bring together in one place, and to evaluate, organize and generalize, the twenty years of experience garnered in the field of nuclear reactor safety. In order to realize such an objective, Project SIFTOR (Safety Information for the Technology of Reactors) was organized, out of which now come these unified studies. 31 authors, each a recognized authority in some phase of nuclear science and technology, have contributed to THE TECHNOLOGY OF NUCLEAR REACTOR SAFETY. Their writings mirror the experience of industrial concerns, Atomic Energy Commission laboratories and university establishments with all the principal reactor types. Each volume more than 700 pages. Vol. I, February, $25.00. Vol. II, June '65, $25.00



EMBODIMENTS OF MIND

by Warren S. McCulloch

This volume offers selected writings of the distinguished American scientist Warren Sturgis McCulloch, doctor, philosopher, teacher, mathematician, poet, and "experimental epistemologist." After twelve years of research in psychiatry and neurology, Professor McCulloch turned to neurophysiology, mathematics, cybernetics, and the logical mechanics of physical machines. The selections in *Embodiments of Mind* express a unity derived from thinking of how brains work in terms of the circuit action of the brain. Seventeen papers, including *A Logical Calculus of the Ideas Imminent in Nervous Activity* and *How We Know Universals, The Perception of Auditory and Visual Forms* (both with Walter H. Pitts). 320 pages, $7.50

SELECTED PAPERS OF NORBERT WIENER

with expository papers by Y. W. LEE and NORMAN LEVINSON. *Published by the M.I.T. Press and the Society of Industrial and Applied Mathematics.* The important mathematical and technical writings of Norbert Wiener, previously available only in journal form, now in one volume. Two of the works included — *Generalized Harmonic Analysis* and *Tauberian Theorems* — are virtually book-length. Both are classics. 480 pages, $12.50

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edited by WARREN M. ROHSENOW. 544 pages, $15.00

THERMAL CONDUCTIVITY OF GASES AND LIQUIDS

by N. V. TSEDERBERG. 432 pages, $12.50

That Radiation "From Above"

The detection of cosmic rays in 1912 launched one of history's most extraordinary adventures

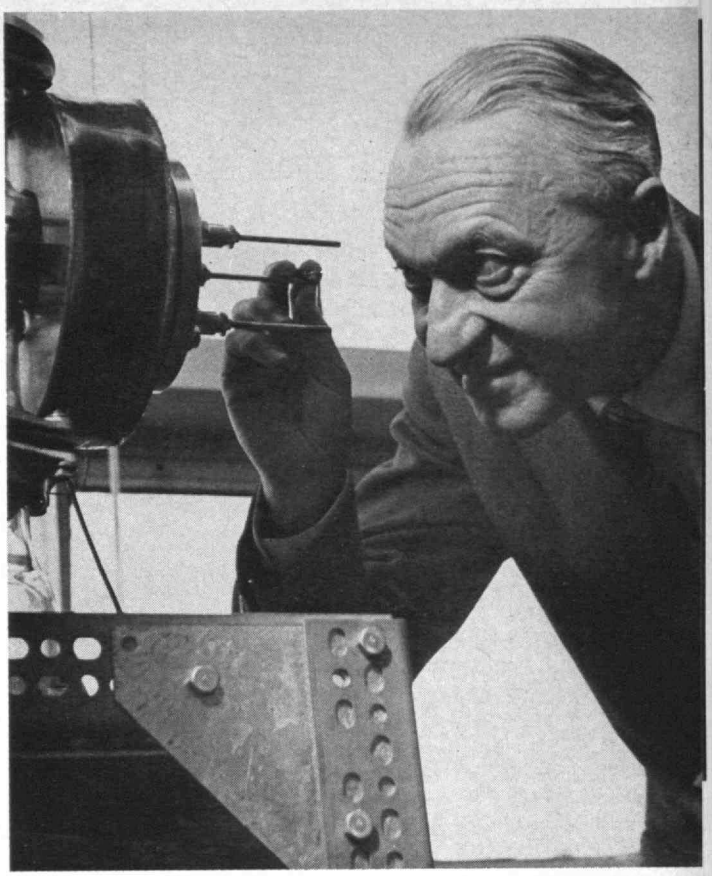
A dramatic and authoritative account*

By Professor Bruno Rossi

AT SIX O'CLOCK on the morning of August 7, 1912, a balloon ascended from a field near the town of Aussig, in Austria. In the gondola of the balloon were three men: a navigator, a meteorologist, and a physicist. During the next two and a half hours, the balloon rose to an altitude of 13,000 feet while drifting rapidly northward. For another hour it floated between 13,000 and 16,000 feet. At noon the balloon touched down near the German town of Pieskow, 30 miles east of Berlin and some 125 miles from Aussig.

The physicist and leader of the flight was Victor F. Hess. He had taken with him three electroscopes of the kind then being used to detect and measure the radiation emitted by radium and other radioactive substances. While his companions took care of the navigation and measured altitude and temperature, Hess watched his instruments and recorded their readings. A few months later, after a careful study of the data, he presented to the scientific community a conclusion of far-reaching significance: "The results of my observations are best explained by the assumption that a radiation of very great penetrating power enters our atmosphere from above."

*This article was drawn from *Cosmic Rays* (a McGraw-Hill Paperback in Physics, $2.95) and appears here by permission.



Professor Rossi directs cosmic-ray research at M.I.T.

This was the beginning of one of the most extraordinary adventures in the history of science. Subsequent investigations of the "radiation from above" (which turned out to be formed of nuclei of the ordinary atoms stripped of their electrons and moving at nearly the speed of light) opened up the new and bewildering world of high-energy physics. Here scientists found particles of subatomic dimensions, with energies thousands, millions, billions, trillions of times greater than the energy of particles emitted by radioactive materials found on the earth. Here for the first time they witnessed processes in which particles of matter are created out of energy and then promptly disappear in giving birth to other particles. Beyond this, Hess's discovery revealed new vistas in astrophysics and cosmology. The mysterious radiation was found to carry important messages concerning the physical conditions of the distant regions of space through which it had traveled on its way to the earth. And finally, in an effort to explain the origin of the radiation, physicists developed a number of novel ideas about the nature of the events that take place in stars and in the masses of dilute gas that fill interstellar space.

Half a century after the discovery of cosmic rays the problem of their origin is still unsolved. We do not know for certain where cosmic rays come from.

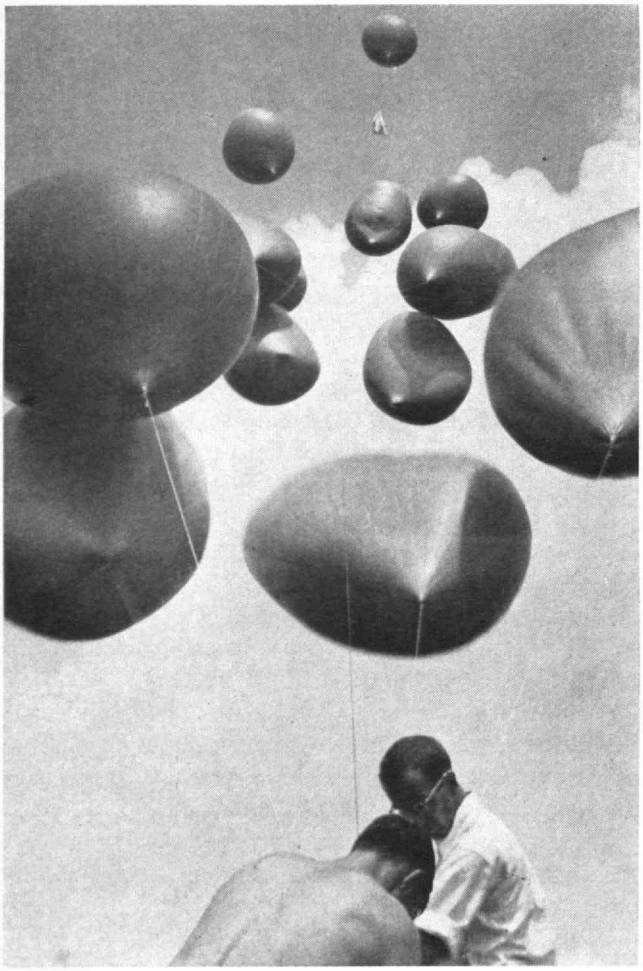
HERE and on pages 24 to 30 this month The Review presents excerpts from recent books by members of the M.I.T. Faculty, and reviews of others likely to interest Alumni and their families.

We do not know for certain how they acquire their tremendous energies.

From the solar flare effects we know that occasionally the sun accelerates particles up to energies of several billion electron-volts (BeV) and more frequently up to energies of several hundred million electron-volts (MeV). We know this acceleration occurs at times of high solar activity, when great eruptions take place and large masses of ionized gases shoot out from the sun into interplanetary space. We also know that magnetic disturbances accompany these eruptions, and we strongly suspect the fast-changing magnetic fields as the agency through which some of the protons in the solar atmosphere acquire high energies. We do not know in detail how this happens; the process may vaguely resemble the processes occurring in some high-energy particle accelerators, such as the betatron in which the accelerating force is an electric field induced by a time-varying magnetic field.

Since the sun produces cosmic rays, why not assume that all cosmic rays come from the sun? The main argument against this assumption rests on the uniform intensity of the radiation at all hours of the day and night. Cosmic rays come not only from the direction of the sun but from everywhere in the sky.

The argument, however, is not as clear-cut as it may seem. The terrestrial magnetic field bends the trajectories of charged particles coming from the sun, making it possible for some of them to reach the night side of the earth. Moreover, scientists have for some time suspected the existence of weak magnetic fields throughout the solar system.



M.I.T. researchers in 1948 investigated cosmic rays with instruments that were carried 19 miles aloft by balloons.

Nonetheless, if cosmic-ray particles actually came from the sun, neither the earth's magnetic field nor the interplanetary magnetic field could account for their almost perfect uniform flow. This conclusion applies to particles with energies of the order of 10 BeV, which form the bulk of the observed radiation. It applies even more forcefully to the particles of much higher energy responsible for air showers.

These particles do not undergo any appreciable deflection either in the interplanetary or in the terrestrial magnetic field. If they were produced by the sun, they would come only from the direction of the sun. On the contrary, as the air-shower experiments have shown, there is no preferred direction of arrival.

If the sun does not contribute a major fraction of the observed cosmic radiation, then where does one look for the main source of cosmic rays? There are, of course, billions upon billions of stars in the universe, and one might think that what reaches the earth is the combined cosmic-ray emission of all these stars. Considering the relative nearness of the sun, however, if the average star produced the same number of cosmic rays as the sun does, the total flux upon the earth of cosmic-ray particles from the sun would be millions of times greater than that from all other stars together. This would still mean that practically all cosmic rays had to come from the sun. And they simply do not.

Of course there may be stars with special properties that make them particularly effective sources of cosmic rays. Conceivably, relatively small numbers of such stars may supply the whole of the observed cosmic-ray flux.

Supernovae have also figured prominently in the speculations on possible cosmic-ray sources. These gigantic explosions of individual stars occur once every few hundred years in our galactic neighborhood (that is, within several thousand light-years of the solar system). An explosion releases an amount of energy equivalent, perhaps, to the total mass of the sun. It has been suggested that these supernovae also give rise to high-energy particles—that is, cosmic rays, and various ingenious ideas have been put forward to explain how this could happen.

Most scientists believe, however, that cosmic-ray particles are accelerated by electromagnetic processes more or less like those at work in solar flares. Astronomers have observed stars in which eruptions resembling solar flares occur with great frequency. They have also observed double stars that possess large magnetic moments and revolve rapidly around a common center of mass, thus producing strong and varying magnetic fields. Finally, there are some variable stars whose exceedingly strong magnetic fields appear

to reverse direction every few days. All of these are possible sources of cosmic rays.

Several scientists, and particularly the Russian astrophysicist V. L. Ginzburg, have pointed out that radio-astronomical observations may offer important clues to the origin of cosmic rays. Their line of reasoning runs as follows. If an electromagnetic field accelerates the protons and heavier nuclei found in cosmic radiation, it presumably accelerates electrons as well. The magnetic field, which is necessarily present in the region where the particles are accelerated, bends the trajectories of the electrons and obliges them to spiral around the lines of force.

Since the motion along a curved path is an accelerated motion, the spiraling electrons must lose energy by emitting electromagnetic radiation. This effect is well known to all physicists working with high-energy accelerators. It is responsible for the visible and ultraviolet light emitted by fast electrons as they circle around and around in a synchrotron, and it is known as *synchrotron radiation*. The same name is used to describe the radiation produced by the magnetic bending of fast electron trajectories in space.

In principle, of course, all charged particles moving in a magnetic field emit synchrotron radiation. But the intensity of this radiation is critically dependent on the mass of the particles. Lighter particles, which are more easily deflected by a magnetic field and which move with higher speeds, radiate much more strongly than heavier particles. In fact, the synchrotron radiation of protons and other nuclei is completely negligible under any conditions, either in the laboratory or, from what we know, in the universe.

Synchrotron radiation by electrons, on the other hand, is often a major effect. Its relative intensity in the various parts of the electromagnetic spectrum depends on the strength of the magnetic field and on the energy distribution of the electrons. Synchrotron radiation in the spectral region corresponding to radio waves contributes to the radio noise arriving from outer space. Radio astronomers have learned how to distinguish this type of radio noise from types arising from different sources.

What I have just said makes it appear likely that the sources of cosmic rays and the sources of synchrotron radiation are closely related. Our nearest star, the sun, is a natural subject for a direct experimental test of this view. A number of observations have shown that solar flares that give rise to high-energy protons are almost consistently accompanied by the outbursts of radio noise known as *type* IV *bursts*. Astrophysicists agree that type IV radio bursts are the result of synchrotron radiation by high-energy electrons spiraling around the magnetic field lines in the solar corona.

Other celestial objects that are strong sources of radio noises have been singled out as likely sources of cosmic rays; among them, in particular, are the gas clouds left behind by supernova explosions. Five or six such remnants of outbursts recorded in historical documents during the last 2,000 years or so are now visible in the sky. The best known is the Crab nebula, a gas cloud about six light-years in diameter and about 4,000 light-years away, the remnant of a supernova explosion observed by Chinese astronomers in A.D. 1054 (a light-year—the distance traveled by light in a year—is approximately 10^{18} cm). The gas within the cloud is still in a state of violent agitation; the motions are clearly discernible from a comparison of pictures of the nebula taken a few years apart.

Photograph from the Mount Wilson and Palomar Observatories

The Crab Nebula in Taurus—an explosion 900 years ago.

The great intensity of the synchrotron radiation from the Crab nebula and the appearance of much of this radiation in the visible region of the spectrum indicate the presence of large numbers of electrons with energies extending up to hundreds of BeV, circling around in relatively strong magnetic fields. Presumably, the mechanism responsible for the acceleration of the electrons also accelerates protons and whatever other nuclei may be present in the nebula. These particles may escape from the Crab nebula into interstellar space. If they do, they may, together with particles originating in the same manner from the remains of the other supernovae, contribute a major portion of the observed cosmic radiation.

Protons and nuclei of the heavier elements are found everywhere in the universe. The problem is not to explain their presence in the cosmic radiation, but rather to figure out how they might have acquired their tremendous energies. So far, we have considered acceleration mechanisms operating within restricted regions of space, such as stellar atmospheres or remnants of supernovae. However, it is also possible that cosmic-ray particles are accelerated gradually, while traveling through space, at the expense of electromagnetic fields

present in the interstellar medium. In 1933, W. F. G. Swann, Director of the Bartol Research Foundation, suggested that the galaxy as a whole might act as a gigantic accelerator of cosmic rays. The principle of the acceleration mechanism proposed by Swann was, in essence, the one later applied in the development of the betatron.

In 1951, Enrico Fermi suggested a more realistic mechanism, based on the general picture of interstellar space that was beginning to emerge from astronomical observations. According to this picture, enormous clouds of ionized gas, mostly hydrogen, wander through space. The clouds contain magnetic fields, just as do the gas clouds ejected from the sun. Fermi pointed out that energy is exchanged between these wandering clouds and fast moving individual particles and that, on the average, the individual particles gain energy in the exchange. Fermi thought of this mechanism as operating within our galaxy. A similar mechanism may be at work in a more limited region of space, such as the Crab nebula or the atmosphere of stars. Also, it may be at work, on a more grandiose scale, in the regions of space between galaxies.

The flux of energy reaching the earth in the form of cosmic rays is approximately the same as that received in the form of light from all stars, excluding the sun. The question of how the cosmic-ray flux found near the earth compares with that in distant parts of the universe is not easily answered. The problem is much more difficult in the case of cosmic rays than in the case of star light, because light travels in straight lines and cosmic-ray particles, being electrically charged, are deflected by magnetic fields. Magnetic deflection may greatly retard the escape of cosmic-ray particles from the regions of space in which they are produced, and thus cause local concentrations in the particle population. In fact, as the discovery of the Van Allen radiation belt around the earth has shown, under proper circumstances charged particles may remain magnetically trapped for long periods of time.

If very effective trapping fields were present in the solar system, a relatively small supply of high-energy particles from the sun would suffice to maintain the observed flux of cosmic rays. Then the sun, and presumably other stars as well, would be surrounded by an "atmosphere" of cosmic rays, whereas the cosmic-ray flux in interstellar space would be negligible. But the magnetic fields in the solar system are not strong enough for this purpose. This is why physicists were compelled to look beyond the solar system in their search for the source of cosmic rays.

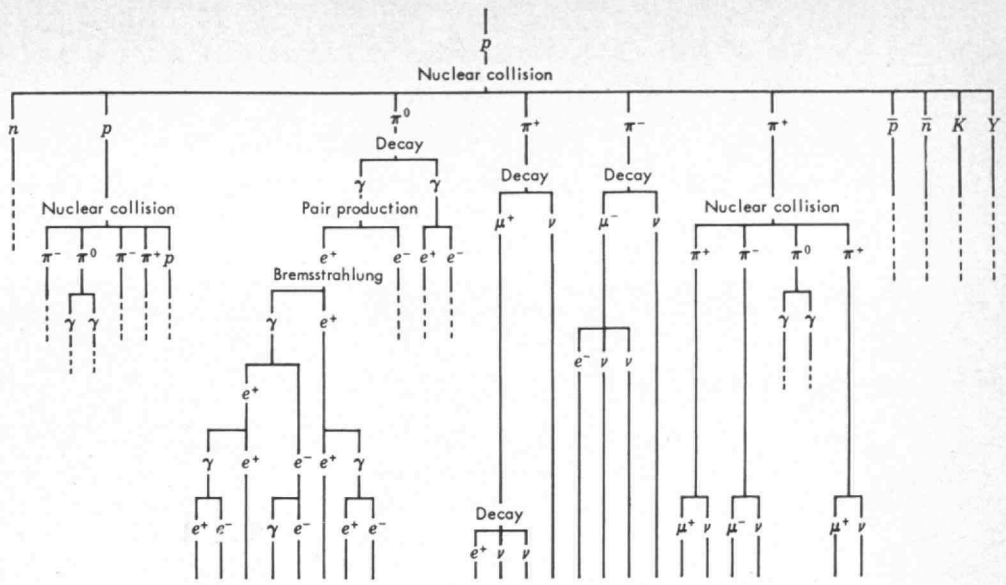
Stars and interstellar matter are not distributed uniformly throughout the universe but are condensed in galaxies. Our own galaxy contains about 100 billion stars. Most of these, particularly most of the younger, more active stars, occupy a flat volume shaped roughly like a grindstone with a bulge at the middle. The diameter of the galactic disk is approximately 100,000 light-years, and its thickness is a few thousand light-years. Much of the interstellar gas and dust is also condensed in this volume. The disk, however, is surrounded by a halo, roughly spherical in shape, formed by old stars and very dilute gas.

It is natural to assume that cosmic rays are produced in galaxies rather than in the nearly empty space between galaxies. If this is so, then most of the observed cosmic radiation should come from our own galaxy.

The solar system is located near the median plane of the galaxy, about two-thirds of the way from the center. The distribution of galactic stars and galactic interstellar matter with respect to the earth is therefore very uneven. This, of course, explains the appearance of the great concentration of stars in the Milky Way. Presumably, the sources of cosmic rays are also distributed very unevenly. If there were no magnetic fields in the galaxy, the intensity of cosmic radiation reaching the earth from different directions would vary. One would expect to find most cosmic rays coming from the center of the galaxy. Yet the intensity of cosmic rays from different parts of the sky does not vary by more than a fraction of 1 per cent. Thus, if cosmic rays are of galactic origin, there must be magnetic fields in the galaxy capable of producing a random distribution of cosmic radiation in space and these magnetic fields will keep cosmic-ray particles trapped in the galactic volume for long periods of time.

Our galaxy, then, and presumably other galaxies as well, would have their own cosmic-ray populations, distributed more or less uniformly throughout their volumes, while in the space between galaxies the density of cosmic rays would be almost negligible. Whether cosmic rays are trapped within the galactic disk or within the galactic halo, and how long the actual trapping time is, are still subjects of debate. One important clue is the composition of cosmic rays. The very fact that the cosmic radiation contains nuclei of heavy elements sets an upper limit to the amount of matter traversed by cosmic rays from the moment they are produced to the moment they are detected. For instance, interstellar gas in the galactic disk has an average density of about one atom of hydrogen per cubic centimeter. Considering the known probability for collisions between nuclei of hydrogen and carbon, a carbon nucleus will travel for about four million years in the galactic disk before colliding with a hydrogen nucleus of interstellar gas. Such a collision would destroy the carbon nucleus. Consequently, since carbon nuclei are found in cosmic radiation, the radiation cannot remain confined in the galactic disk for more than a few million years on the average.

Until a few years ago it was generally believed that all cosmic rays arriving at the earth were produced in our own galaxy. This belief has been seriously shaken by the results of air-shower experiments that have gradually pushed the upper limit of the cosmic-ray spectrum to higher and higher energies. The occurrence of primary cosmic rays with energies at least as great as 6×10^{19} electron-volts has been established. It does not seem possible that particles of such enormous energy



Progeny of a cosmic-ray particle. The primary particle (usually a proton) collides with a nucleus of oxygen or nitrogen in the atmosphere. The products include neutrons, protons, neutral mesons, charged mesons, antiprotons and antineutrons, heavy mesons, and hyperons. Neutral mesons decay into gamma rays, which in turn materialize into electrons. Charged mesons may strike other atmospheric nuclei or decay into mesons and neutrinos. Broken lines indicate further interactions will take place.

may remain trapped in the galactic disk or even in the galactic halo for any great length of time. If they do not remain trapped, then one must conclude that they are to be found in the space between galaxies, as well as in the space within galaxies, and that most of those observed on earth come from the space beyond our galaxy.

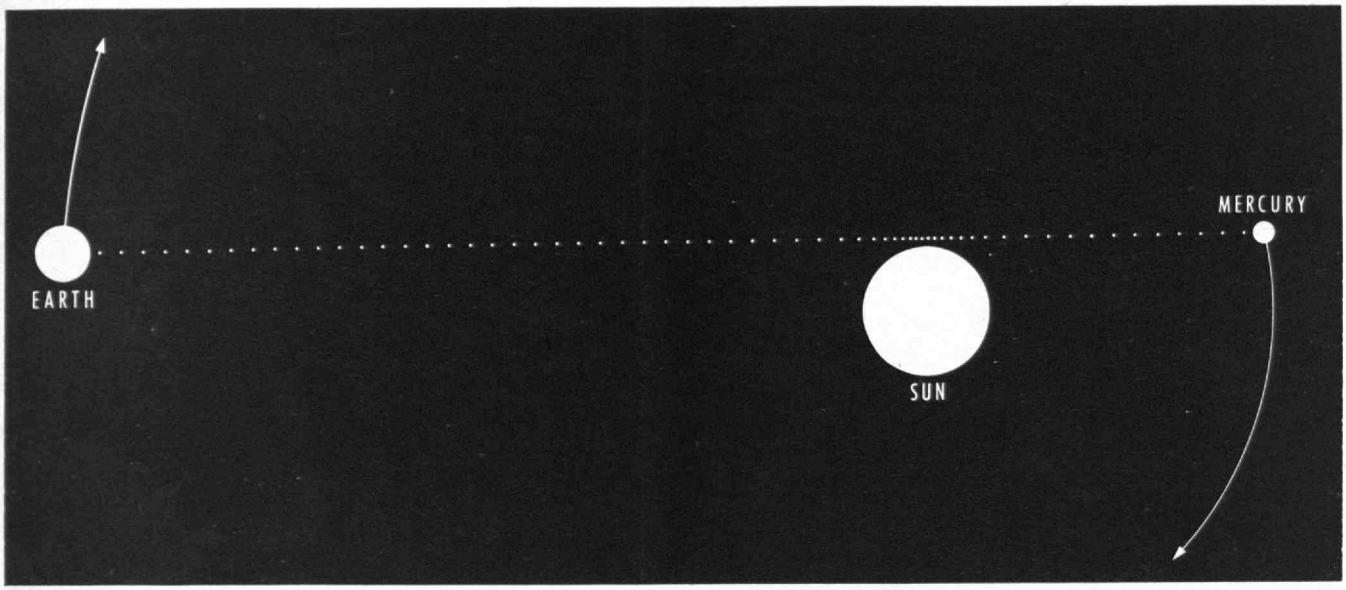
These pages were written a few days after the fiftieth anniversary of Hess's flight with which my story began. The half century covered by this story has been a revolutionary period for science. And cosmic rays, as I have tried to show, have played a major role in the developments that have so greatly enlarged the horizon of our knowledge. Without the wholly unexpected facts and without the tantalizing clues that came to light through the study of cosmic rays, high-energy physics might be still in its infancy. Indeed, physicists might not yet have discovered mesons and all the other particles that have been their major concern during the last decade. And it is certainly not a mere coincidence that the first scientific discoveries of the space age—including the discovery of the Van Allen radiation belt—were made by cosmic-ray physicists.

It is particularly appropriate at this time to pause and look back on the history of cosmic rays, not so much because the fiftieth anniversary of their discovery calls for some sort of celebration, but because, curiously enough, the anniversary comes at a critical moment for cosmic-ray physicists, if not for cosmic-ray physics itself. The interest in cosmic rays is certainly not waning; on the contrary, it is steadily growing. But cosmic-ray research has become such an integral part of many different scientific endeavors that it has almost ceased to exist as a separate and distinct branch of science. The "cosmic-ray physicist," as a specialist, is becoming a figure of the past, while the nuclear physicist, the geophysicist, the astrophysicist, and the cosmologist are turning more and more to the study of cosmic rays for information of vital importance to the solution of their problems. It is quite possible that future historians of science will close the chapter on cosmic rays with the fiftieth anniversary of Hess's discovery. However, they will undoubtedly note that in renouncing its individuality and merging with the main stream of science, cosmic-ray research continued to perform a vital role in advancing man's understanding of the physical world.

An M.I.T. cosmic-ray research station in the southwestern desert near Albuquerque—as photographed by J. Frederick Laval.

A New Test of General Relativity

Advances in radar astronomy have made it practicable to test Einstein's theory in a fourth way



Closeness of dots suggests how radar pulses traveling between the earth and Mercury might be slowed when near the sun.

RECENT ADVANCES in radar astronomy, Irwin I. Shapiro of the M.I.T. Lincoln Laboratory wrote in the December 28 issue of *Physical Review Letters,* have made possible a fourth test of Einstein's theory of general relativity.

Disparities between that theory and Newton's theories become measurable only when the scale of an experiment is very large, and the experiment Dr. Shapiro has proposed would involve measuring the time required for radar pulses to reach either Venus or Mercury and return to the earth. Since, according to the Einstein theory, the speed of a light or radio wave depends on the strength of the gravitational potential along its path, the time required should be greater by almost one-fifth of a millisecond when the radar pulses pass near the sun. Such a difference, Dr. Shapiro noted, would be equivalent to 60 kilometers in distance and could be measured with equipment that is now obtainable.

Only three practicable types of experiments have been proposed previously to test the general theory of relativity. Einstein himself formulated these half a century ago. Each type has yielded results that agree with the theoretical predictions within the accuracies of the experiment. Thus the experimental evidence to date supports the validity of the theory, but this evidence is neither as accurate nor as extensive as scientists concerned with the cosmos and the philosophical implications of the theory would like to have.

No single experiment has been proposed that would validate the general relativity theory as a whole. Each of the types conducted heretofore tested some individual facet of the theory:

► One type of test measures the "gravitational red shift," in which general relativity predicts that a gravitational field will alter the frequency of a light wave; the most sensitive and accurate experiment of this type to date has been conducted by R. V. Pound of Harvard University, utilizing the Mossbauer effect to achieve an experimental accuracy of about 1 per cent.

► The second type, also dealing with an effect of gravity on light waves, measures the bending of light rays from distant stars by the gravitational field of the sun; experiments of this type have been conducted since 1919 in conjunction with solar eclipses, but the results of various observers agree to within only about 25 per cent of the predicted change.

► The third type involves a small but observable effect on the orbit of the planet Mercury (specifically, an anomalous precession of the orbit's perihelion), a rotation of the planetary orbit at an angle of 43 seconds of arc per century in excess of the rate predicted by Newtonian theory; meticulous optical measurements are interpreted to confirm this prediction.

(Certain other experiments which are widely known, such as the Michelson-Morley "ether-drift" experiment, have had to do with the special theory of relativity rather than the general theory.)

The test Dr. Shapiro has suggested would provide

(*Concluded on page 42*)

The Trend Of Affairs

To Continue Your Education

TWENTY-FIVE special summer programs will be offered at M.I.T. this year for Alumni and others interested in continuing their schooling. Professors in charge, topics, and dates will be as follows:

Frederick J. Adams, *City and Regional Planning,* June 21-July 2.

Roger W. Brockett, *Introduction to the Optimal Control and Stability of Nonlinear Systems,* August 2-13.

Nathan H. Cook, '50, *Physical Measurement and Analysis,* June 15-25.

Albert G. H. Dietz, '32, *Plastics in Architecture,* June 21-25.

Jay W. Forrester, '45, *Industrial Dynamics: Advanced,* June 15-25.

Harold A. Freeman, '31, *Design and Analysis of Scientific Experiments,* July 12-23.

Robert J. Hansen, '48, *Structural Models,* June 28-July 2.

John B. Hersey and Harold E. Edgerton, '27, *Techniques in Oceanographic Instrumentation,* June 21-25.

Joseph H. Keenan, '22, *Thermodynamics Workshop,* July 19-30.

John D. C. Little, '48, *Operations Research in Marketing,* August 30-September 10.

Richard C. Lord, *Infrared Spectroscopy:Technique,* June 21-25; *Infrared Spectroscopy: Applications,* June 28-July 2.

Donald G. Marquis, *Management of Research and Development,* August 2-13.

Richard I. Mateles, '56, *Fermentation Technology,* June 21-25.

William M. Murray, '33, *Photoelasticity and Moiré Techniques,* June 15-19; *Nondestructive Testing,* June 21-25; *Strain Gage Techniques: Lectures,* July 6-10; *Strain Gage Techniques: Laboratory,* July 12-16.

Robert E. Ogilvie, '52, *The Electron Microanalyzer and Its Applications,* June 21-July 2.

Robert P. Rafuse, '57, *Electromagnetic Compatibility,* August 16-27.

Charles N. Satterfield, '43, *Catalysis and Applied Kinetics,* August 2-13.

Steven R. Tannenbaum, '58, *Dehydration and Irradiation of Food,* June 21-25.

Leon Trilling, *Gas Surface Interactions,* July 6-16.

George P. Wadsworth, '30, *Methods of Operations Research,* August 30-September 10.

Zenon S. Zannetos, '55, *Concepts of Management Planning and Control Systems,* June 15-25.

Further information regarding these courses may be obtained from the Director of the Summer Session at M.I.T.

Reverse TV

STUDENTS in the M.I.T. Graduate House have a color television set that lies on its back and produces pictures and typography in reverse. They see the correct image in a large mirror above the set.

Gay Carley, '61, TV chairman of the house, conceived the scheme to enable more people to watch TV without getting in each other's way. Using the mirror increases the effective optical length of the room by six feet, he explains. The mirror is four-by-eight feet and cost $75.

But to use it the picture as seen on the video tube had to be reversed. This can be done on a black and white set simply by switching wires to one of the magnetic yokes that deflects the electron beam, says Mr. Carley, but a color set is more troublesome because adjustments also must be made in the circuits that control color purity and the convergence of the beams from the three electron guns. This operation took Mr. Carley about eight hours, but he was already familiar with the set from the month he had spent repairing it when it was acquired, inoperable, in a swap with the Department of Electrical Engineering.

The 450 residents of Graduate House spend about 1,000 man-hours a week watching television, especially news and movies, Mr. Carley estimates. Some students sat through hours of backwards pictures of the Republican National Convention, he says, because the mirror was removed last July during remodeling.

Mr. Carley, a native of Ardmore, Pa., is vice-president of Graduate House. He is doing a doctoral thesis on the feasibility of using a focused laser beam for computer memory storage.

Architects Designated

I. M. PEI, '40, is the architect chosen for the John F. Kennedy Memorial Library at Harvard University, for which more than the original goal of $10 million has been raised. Mr. Pei was the architect of the Center for Earth Sciences at M.I.T., the Newhouse Communications Center at Syracuse University, and many other notable buildings throughout the U.S. His colleagues describe him, says The New York *Times,* as "a very disciplined architect with an evolutionary rather than revolutionary style."

Edward Durell Stone, '27, is a member of a joint venture firm awarded the contract for master planning of the much discussed Electronics Research Center for the National Aeronautics and Space Administration near M.I.T. Mr. Stone's noted architectural works include the New York City Civic Center Development and the U.S. Embassy in New Delhi, India. His associates in planning the NASA center will be Giffels and Rossetti of Detroit and Charles A. Maguire Associates of Boston and Providence. Award of the contract to them was announced by Brigadier General Peter C. Hyzer, '49, Division Engineer, U.S. Army Corps of Engineers, and Winston E. Kock, Director of the Center.

Laser Diagnosis of a Plasma

THE MOON is the largest object at which M.I.T. scientists have beamed a laser. They performed that scientific stunt on three nights in May, 1962, and were able to detect the weak light reflected back to earth. Later, a laser was used to study clouds of meteoric dust in the atmosphere. These days they are turning laser light on very small things—electrons. The cross-section of these particles is only about one barn, a unit of area equal to 10^{-24} centimeter. But the tiny amount of light scattered from them is proving to be a useful new gauge of what is going on inside a plasma, the so-called fourth state of matter.

Small metal probes have been generally used heretofore in measuring density, velocities, and distribution of electrons in a plasma. These Langmuir probes deplete the plasma near them, however, so that scientists have not been sure they were getting information on the true properties of the whole plasma. Besides, in a controlled fusion plasma such a probe would melt. Thus one advantage of the new method of plasma diagnostics with laser beams is that reliable measurements can be made at any point within a plasma without disturbing it.

A typical laboratory plasma produced by the M.I.T. experimenters had 10^{14} electrons per cubic centimeter, says Edward T. Gerry, G, who recently reported the laser work. With this density, the plasma in a one-centimeter length of laser beam scatters less than one part in 10,000 million of the incident radiation. Thus the plasma is 100 times more transparent than "the freshest country air." By careful control of the laser operation and by constructing a special "light dump" to absorb internal reflections, he says, it is possible to observe the weakly scattered signals consistently.

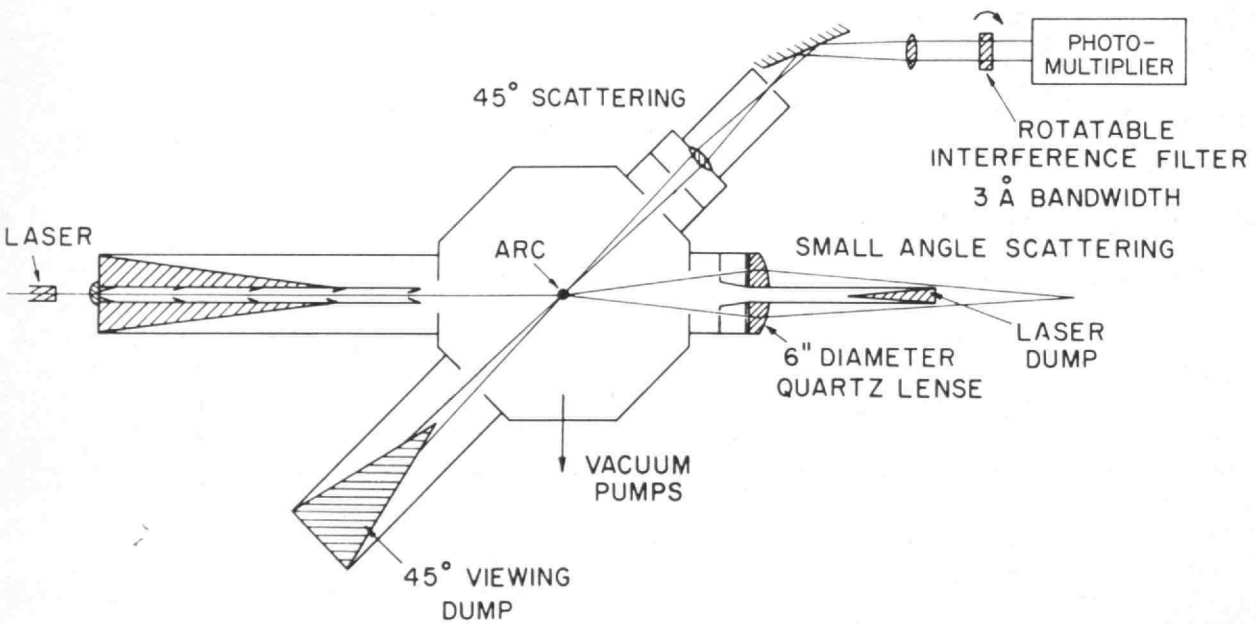
Because of the thermal motions of the electrons in the plasma, the wavelength of the scattered radiation is shifted, according to the Doppler effect, by an amount that depends on the velocity of the scattering electron. Analyzing the spectrum of the scattered light gives precise information on electron energy, density, and distribution of velocities at a specific point within the plasma, according to Mr. Gerry, who developed the technique under the supervision of Professor David J. Rose, '50. The instrumentation used in the studies in the Research Laboratory of Electronics included a pulsed ruby laser of 50 joules and a relatively "cool" argon plasma with an electron temperature of 25,000 to 50,000 degrees Kelvin (indicated by the "arc" in the arrangement depicted below).

So far the method has been used at scattering angles of 45 degrees, but experiments at angles of 10 degrees or less are expected to yield even more information. In the latter case, the laser radiation appears to be scattered from clumps of particles, so that it will be possible to measure fluctuations in electron density. At small angles the plasma ions also scatter light, which will produce data useful to the many theorists.

The moon-bounce experiment was directed by Professor Louis D. Smullin, '39, and by Assistant Professor Giorgio Fiocco, who also made the study of dust clouds. The plasma analytical technique is an outgrowth of research on electron-beam scattering done by Professor Fiocco and research associate Ernest Thompson.

Electronics in Review

THE M.I.T. Research Laboratory of Electronics, directed by Professor Henry J. Zimmermann, '42, is one of nine university centers supported by the Army-Navy-Air Force Joint Services Electronics Program. About 60 representatives of federal agencies, including Lieutenant Colonel William C. Athas of the Air Force, Arnold Shostak of the Office of Naval Research, and S. Benedict Levin, representing the U.S. Army, reviewed its work at M.I.T. last December 9.



Electronic Penmanship

EXPERIMENTS in the M.I.T. Research Laboratory of Electronics have suggested that your distinctive penmanship may have been determined by the way your training programmed your nervous system. Once triggered by pre-set signal patterns, your strokes always come out about the same.

When you write at normal speed, your control of your hand is discontinuous, i.e., stroke to stroke, but when you write slowly your control appears to be more continuous, which may make it harder to preserve your handwriting style.

Assistant Professor John S. MacDonald, '61, has ventured these suggestions in the course of analyzing and electronically simulating people's handwriting, as shown in the next column.

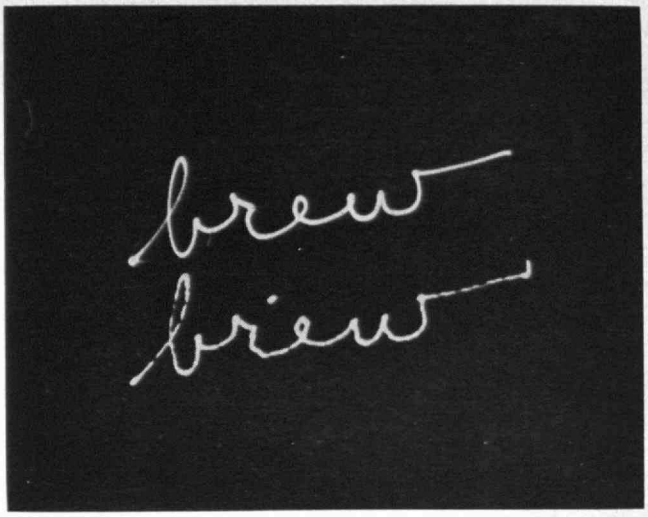
There are several ways in which handwriting can be measured. Professor MacDonald asks persons assisting him in his experiments to write in water with an insulated electric stylus. He has a shallow, covered tank, four feet square and an inch deep, with electrodes on its sides, and a 3-by-6 inch "writing hole" cut in the center of the cover.

When a person submerges the point of the stylus in the water through this hole, and writes letters or words, the electrodes generate current signals. These describe the displacement of the stylus from the exact center of the tank bottom, which is conductive. One signal is generated for side-to-side movement of the stylus and another for up-and-down movement. These displacement signals are processed to obtain stylus acceleration signals.

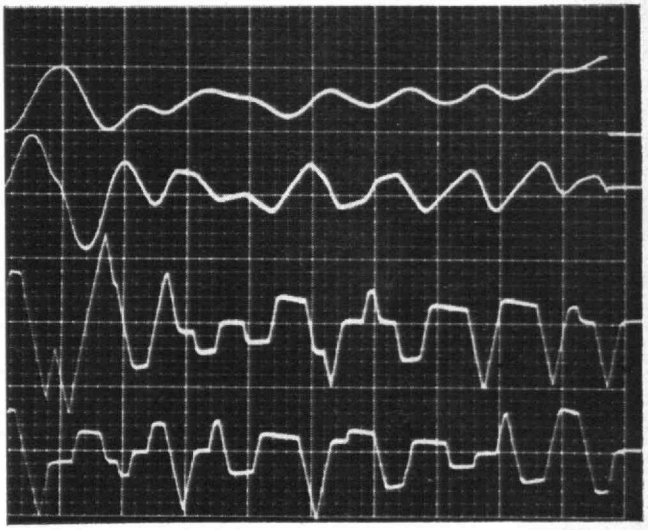
With this apparatus, Professor MacDonald has found that different people generate different acceleration wave forms when writing the same word, suggesting that differences in their handwriting result from differences in the nerve signals driving their writing muscles. But he is careful to point out that this is only a guess, because he actually measures only the motion of the stylus, not current in nerves.

Acceleration waves, he has found, have a square or trapezoidal shape. They rise abruptly, hold very nearly steady for a tiny increment of time, then fall sharply, with the plateaus at various amplitudes. The squareness of these waves suggests discontinuous control. At slow writing speeds, though, the curves change in ways that suggest the writer's control of his pen is more nearly continuous.

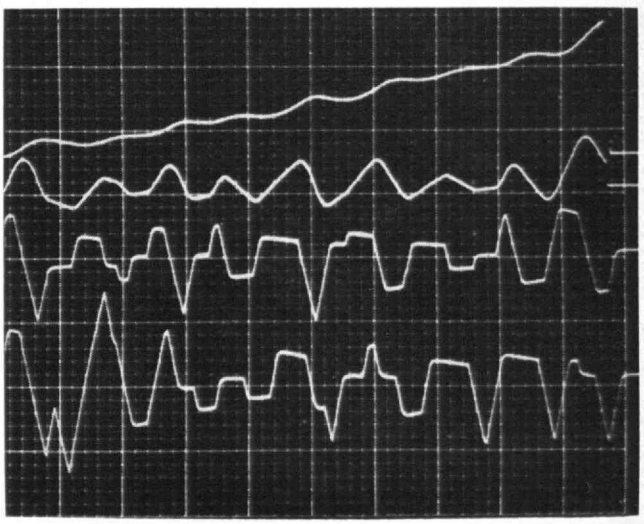
To simulate a person's penmanship after it has been recorded in water in this manner, Professor MacDonald uses a two-channel system to produce signals having nearly the same wave shapes as the measured handwriting. One channel in the simulator circuit imitates the form of the horizontal projection of the person's handwriting, and the other channel produces a wave form mimicking the vertical component. These two simulated components are then combined and displayed on an oscilloscope. The result is a good duplicate of the original writing.



An electronic handwriting simulator wrote the word "brew" (top) after it had been written by a person (bottom). The word was chosen because of the variety of strokes used to write it. Oscilloscope records below describe the wave forms used in simulation.



The record above shows (top to bottom) vertical displacement, vertical velocity, vertical acceleration, and horizontal acceleration. The one below shows (top to bottom) horizontal displacement, velocity, and acceleration, and vertical acceleration. Note squareness of acceleration waves, indicating discontinuous control.



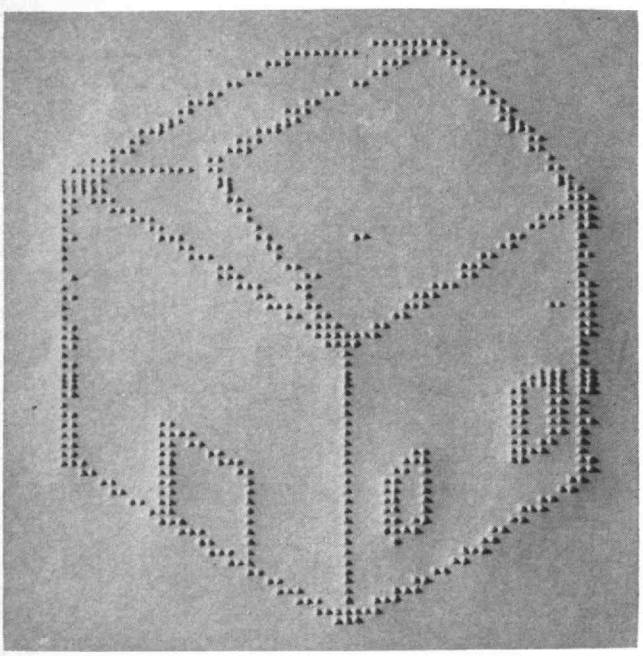
Pictures in Braille

BESIDES its bulk, another obvious feature of a Braille book is its lack of illustrations. This is because Braille pictures have to be prepared laboriously by hand with an assortment of tools for embossing. An electromechanical picture Brailler developed at M.I.T. reproduces line drawings in standard raised Braille dots. Leung Cho Ng, '64, a student from Hong Kong who worked out the device for his senior thesis, believes that it represents the first attempt to mechanize the production of Braille pictures.

A drawing to be reproduced by the machine is placed on a commercial X-Y plotter in which the drawing pen has been replaced by a phototransistor. As the drawing is scanned, the Braille representation is punched into a standard 11-by-11 inch sheet of Braille paper by an embossing mechanism designed by Assistant Professor Donald E. Troxel, '60, who supervised Mr. Ng's thesis. This unit consists of a rotatable drum and a carriage that moves an embossing pin. The digital logic circuits to control scanning and punching were developed by Mr. Ng.

A grid of 100 by 100 dots is available to form a Braille picture, which takes about 15 minutes with the prototype model. The Brailler can reproduce enlargements or reductions of line drawings and has been used experimentally to turn out geometric figures, graphs, flowcharts, circuit diagrams, and phonetic symbols of speech. A major use of such a device would probably be in reproducing much needed maps. The prototype Brailler proved to be practical in tests with blind persons.

It can also be used to produce pictures for experiments in pattern recognition and this will be one of its applications in the Cognitive Information Processing Group, in the Research Laboratory of Electronics, where Mr. Ng is continuing his studies.



The prototype model of a picture Brailler made a sketchy but recognizable reproduction of line drawing of a house.

Bibliofile

THE M.I.T. libraries have more than 900,000 volumes and are expected to reach a million within two years. For this and other reasons they are changing from the Dewey to the Library of Congress classification system. The latter, says Professor William N. Locke, Director of Libraries, is the only one suitable for collections of more than a million volumes and offers substantial economies in library operation.

Not only the number of books but knowledge itself is growing rapidly, Professor Locke notes, and the Library of Congress system provides 21 major divisions that are kept up to date as new areas of knowledge emerge, as against 10 in the other system. Classification for a high percentage of published books is centralized, so the Institute's libraries are freed from doing their own original cataloguing. This, in turn, reduces the need to train cataloguers in special methods and allows professional librarians to devote their efforts to other work.

About 100,000 volumes, including all the library's new books, have been reclassified under the Library of Congress system since the change-over was started two years ago, but conversion of the active part of the library will take at least a decade. The M.I.T. collection then will be an integral part of the nation's library resources and able to benefit from any of the schemes proposed to tie the research libraries of the nation into one network.

As compared to books in the humanities, those in science and engineering soon become obsolete. Therefore it is questionable, Professor Locke says, whether it will be worthwhile to reclassify many of the latter that are more than 15 years old. Circulation of a technical volume usually dips sharply after the first five years, he notes.

To complete the change to the new system the old Dewey subject headings have to be taken out of the card catalogue and entries of all the old books corrected. This is a major job but should be completed in time for eventual mechanization, based on current studies of the application of information-processing techniques to library operation, headed by Professor Carl F. J. Overhage.

Railroad Property Purchased

A BLOCK-LONG section of a New York Central Railroad right-of-way in Cambridge has been purchased by M.I.T. The strip of land, which is part of the railroad's Grand Junction Branch, runs eastward from Massachusetts Avenue to Main Street and is from 72 to 82 feet wide. In addition the Institute has agreed to purchase three other sections of the right-of-way west of Massachusetts Avenue during the next three years. Each of these parcels is 500 feet long.

M.I.T. expects in the future to construct educational or research buildings on the property. Under terms of the deed, the railroad's Boston and Albany Division, which operates the branch, will continue to use one of the four present tracks in order to maintain a link for freight service.

Synthetic Penicillin Patented

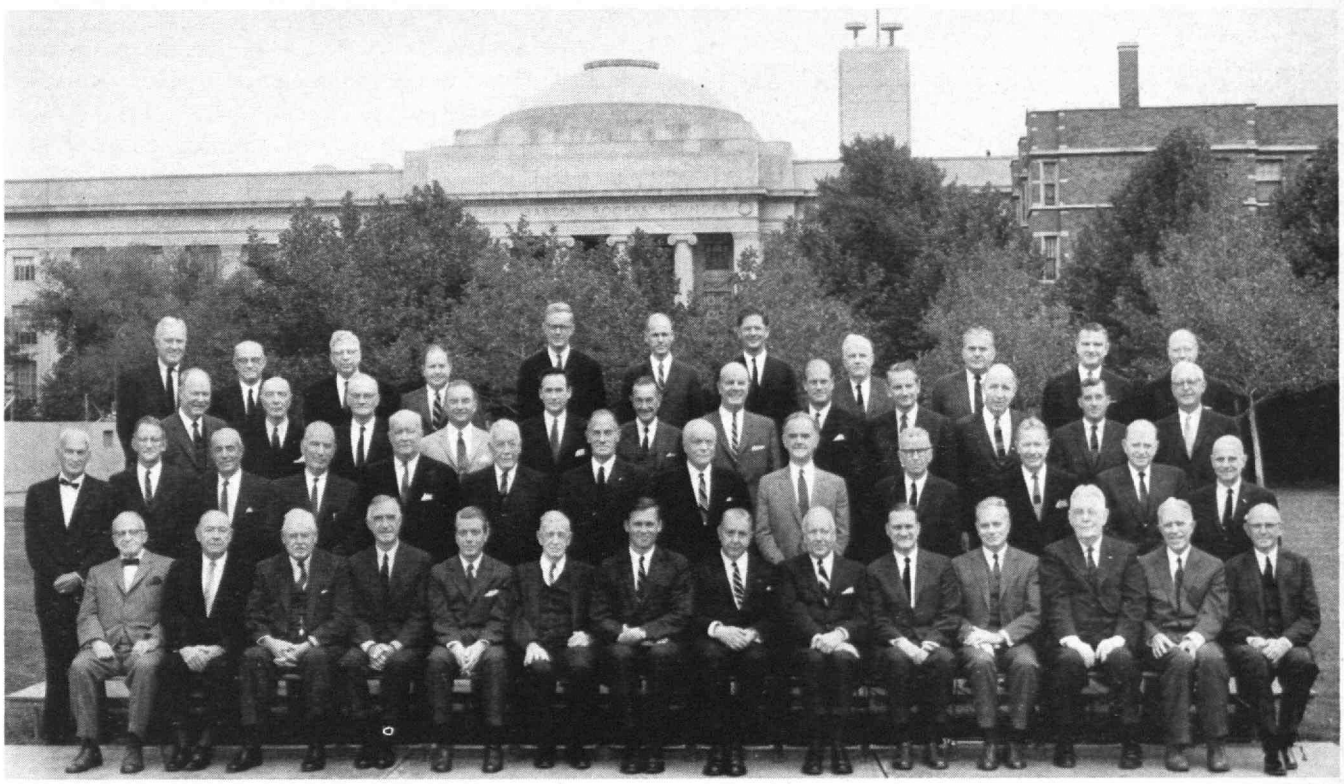
THE BASIC PATENT on the chemical synthesis of penicillin devised by Professor John C. Sheehan of M.I.T. has been issued in Washington.

Natural penicillins, produced directly by molds in a fermentation process, are used extensively in medicine but have not proved suitable in the treatment of certain infections. Some staphylococcus organisms, for example, have become resistant to natural penicillins and created a major problem for hospitals. Using the Sheehan process, new types of penicillin can be made and, in fact, three such penicillins are now used effectively against "penicillin-resistant" staphylococcus organisms. The pharmaceutical industry has produced more than a thousand new synthetic penicillins by the Sheehan method. Five of these are now used in the United States.

Thousands of chemists in the United States and Great Britain tried in vain to synthesize penicillin during World War II. The molecule is so unstable that its structure tends to fly apart when manipulated chemically. Professor Sheehan undertook the task in 1948 and with the help of graduate and post-doctoral students worked for nearly nine years before finding that a synthesis could be accomplished.

The general penicillin synthesis involves the acylation of a key intermediate (the penicillin nucleus, 6-aminopenicillanic acid), thus making possible the attachment of various side chains to a basic penicillin nucleus. This same intermediate was subsequently prepared by efficient fermentation methods and the present commercial production involves chemical acylation of this intermediate by the Sheehan process. Bristol Laboratories of Syracuse, N.Y., which gave financial support for Dr. Sheehan's research, has been licensed to use the patent.

Professor Sheehan received the John Scott Award at the Intersciences Conference on Anti-Microbial Agents and Chemistry last October—an honor previously bestowed on Provost Charles H. Townes, Vannevar Bush, '16, and Professor R. B. Woodward, '36, of Harvard. Dr. Sheehan joined the Faculty of M.I.T. in 1946. He is a consultant to the President's Scientific Advisory Committee, a member of its Committee on Military Applications of Chemistry and Biology and its Limited War Panel, and also consultant to the Arms Control and Disarmament Agency of the State Department.



Assembled on Campus

M.I.T. Corporation members meeting last fall included: Front row (from left), Horace S. Ford, H. B. Richmond, '14, Ralph Lowell, John J. Wilson, '29, James McCormack, '37, Vannevar Bush, '16, Endicott Peabody, James R. Killian, Jr., '26, Julius A. Stratton, '23, Joseph J. Snyder, '44, Owen B. Kiernan, Bradley Dewey, '09, Thomas C. Desmond, '09, Marshall B. Dalton, '15.

Second row, Donald F. Carpenter, '22, Walter J. Beadle, '17, Thomas D. Cabot, Crawford H. Greenewalt, '22, Duncan R. Linsley, '22, Irving W. Wilson, '11, Lloyd D. Brace, Thomas D'A. Brophy, '16, William A. Coolidge, Mervin J. Kelly, Robert C. Sprague, '23, Charles A. Thomas, '24, James H. Doolittle, '24.

Third row, Edward J. Hanley, '24, Robert A. Lovett, Cecil H. Green, '23, Gilbert M. Roddy, '31, George P. Gardner, Jr., George P. Edmonds, '26, Bennett Archambault, '32, Robert H. Winters, '33, Laurance S. Rockefeller, William Webster, '23, William B. Bergen, '37, John R. Kimberly, '26.

Rear row, Robert B. Semple, '32, U. A. Whitaker, '23, Theodore A. Mangelsdorf, '26, Frank R. Milliken, '34, Edward M. Purcell, D. Reid Weedon, Jr. '41, Irénée du Pont, Jr. '43, Eugene McDermott, Emilio G. Collado, '31, Marshall W. Gabel, '39, Samuel A. Groves, '34.

(The Trend of Affairs is concluded on page 44)

In Response to a Nobel Award

The text of the address by the M.I.T. Provost after the presentation ceremonies in Stockholm

By Charles H. Townes

YOUR MAJESTIES, Your Royal Highnesses, Your Excellencies, Ladies and Gentlemen:

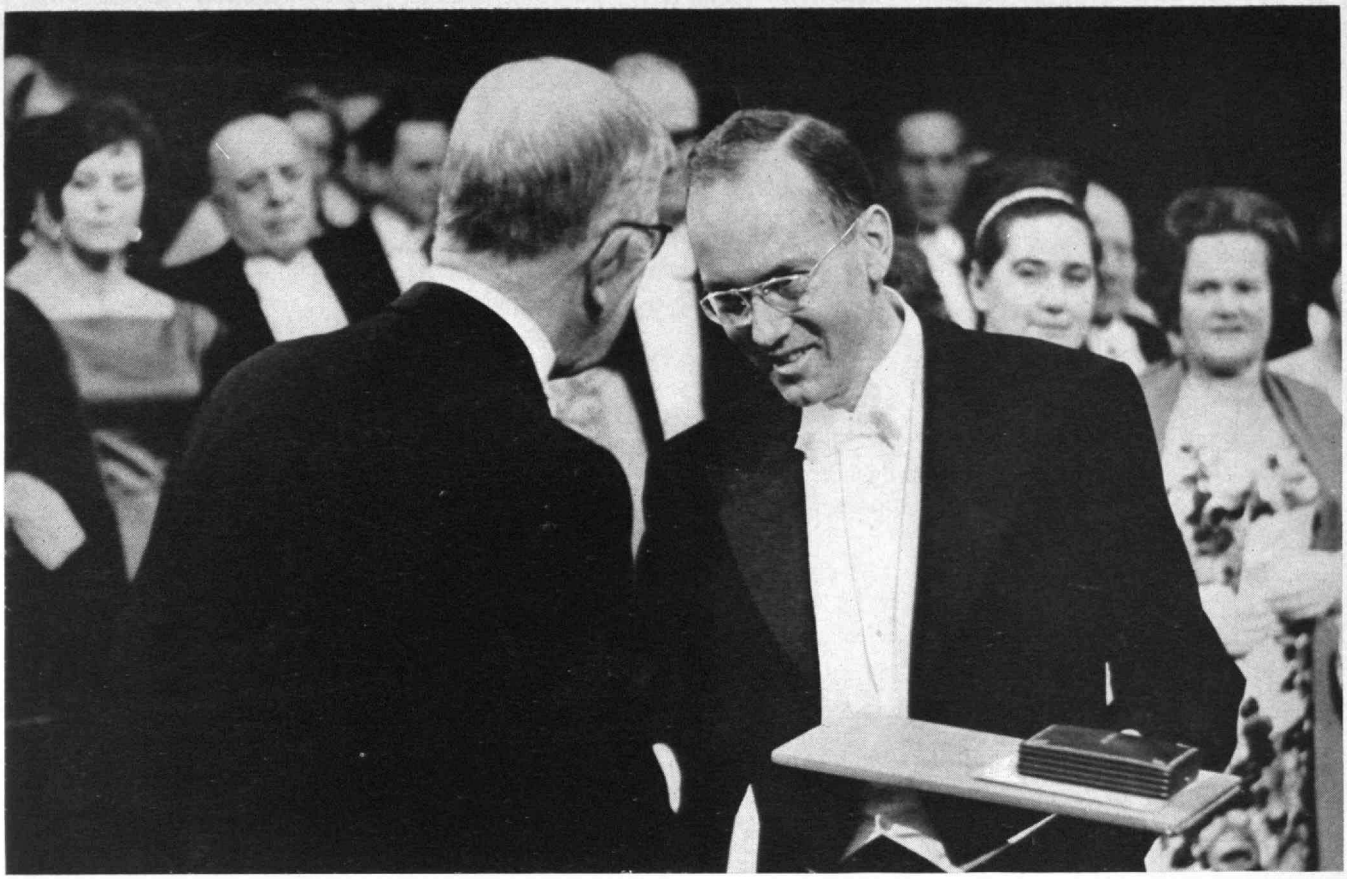
"The wisdom of the Swedish people, the warm interest of the Swedish Royal Family, and the dedication of its academies have made much more than a reality of Alfred Nobel's magnificent concept. They have endowed the Nobel Prize with an aura which has inspired intellectual and creative work everywhere. They have brought a special affection for Sweden and its ideals. And they have made this occasion the highest point in the public part of any scientific career. I am, of course, deeply grateful to you and will treasure this connection with Sweden.

"But there are other things for which I am grateful which may be a little less obvious on this occasion when a few individuals are singled out for high honor. There is some truth to the idea that in the field of science individual contributions of great significance are possible. But the development of science is basically a social phenomenon, dependent on the hard work and mutual support of many scientists and on the society in which they live. Scientists do stand on the shoulders of giants of the past. And we who are honored today have also depended heavily on the work of many others—our colleagues, some of whom are as worthy of being here as we are, some of whom have carried out fascinating and essential exploration of a less spectacular nature, some of whom have done necessary work with devotion and courage on problems which don't seem now to have been very fruitful. To all these I am grateful.

1964 NOBEL LAUREATES at the presentation ceremony. From left: Dr. Townes, Aleksandr M. Prochorov and Nicolai G. Basov, physics; Mrs. Dorothy Crowfoot Hodgkin, chemistry; and Drs. Konrad Bloch of Harvard and Feodor Lynen, medicine.

"The world-wide character of the scientific community, and of much of the mutual support in science, is well illustrated by the laureates here tonight. No one can be an intimate part of the scientific effort without being appreciative of the exciting and cumulative effects of this broad co-operation and of the coherence (if I may use a term familiar to my own field of masers)—the coherence of the many individual contributions to science. Nor can any scientist be an intimate part of his world without wondering if somehow other more difficult aspects of human affairs can experience more strongly these coherent and cumulative effects, if a larger portion of human effort can be additive and mutually supporting. Our nature is, of course, more severely taxed in nonscientific fields to clearly recognize overriding human goals and to work towards them with objectivity and sometimes at personal and national sacrifice, when we no longer have hard experimental results to straighten us out when we err a little too far. But the imposing edifice of science provides a challenging view of what can be achieved by the accumulation of small efforts in a steady, objective, and dedicated search for truth.

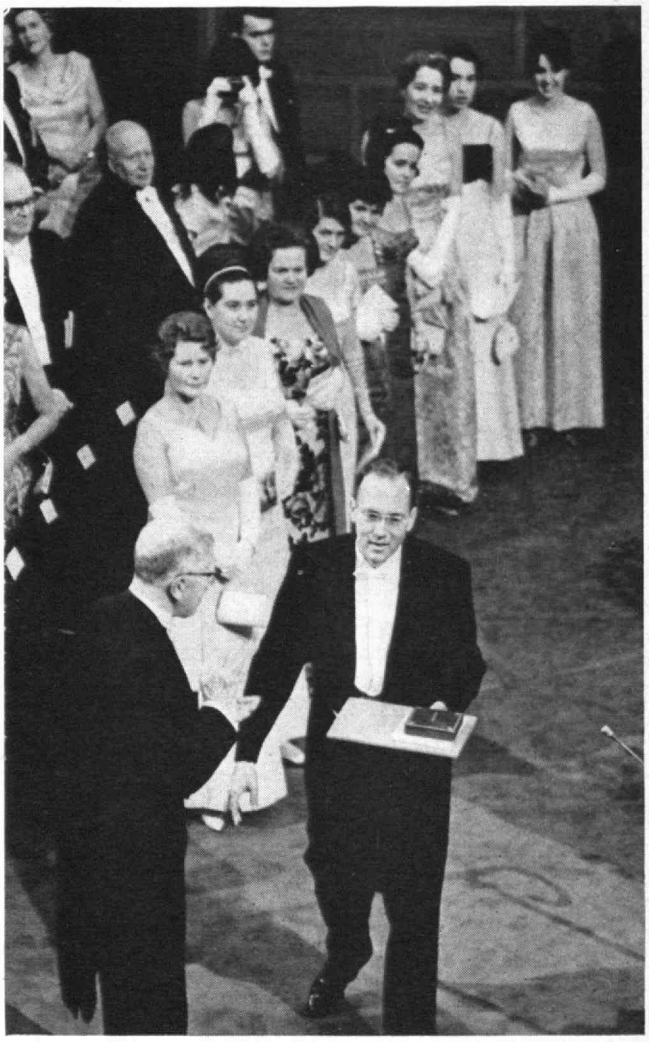
"Alfred Nobel understood very well the necessary supranational character of the human enterprise. His representatives here, and Sweden as a nation, have carried out a noble and extraordinary pursuit of this idea. For this we can all be grateful and we wish them well. There is, however, hard work ahead for all of us. And if we succeed in making appreciably more coherent our individual human efforts, and in crossing a few thresholds we have not attained so far, the results can be amazing."



The Highest Public Point Of Any Scientific Career

PROVOST CHARLES H. TOWNES of M.I.T. was one of six scientists who received Nobel awards from the hand of the King of Sweden in the Stockholm Concert Hall last December 10.

Mrs. Townes and his four daughters attended the presentation ceremony and are shown in the photo, at the right, at the far end of the first row and in the second row of onlookers. The picture below is of Princess Sibylla and Dr. Townes at the banquet afterwards.



New Books

THE SINO-SOVIET RIFT, by William E. Griffith (*The M.I.T. Press, $7.95; paper, $2.95*).

Reviewed by Robert E. MacMaster, *Associate Professor of History and Literature at M.I.T.*

THE rapidly escalating quarrel of the two leading communist powers over more than half a decade promises to be one of the most significant phenomena in modern history. Participants in healthy alliances have usually quarreled after victory not before. The Sino-Soviet dispute appears to be at once a symptom and a catalyst of deep fissures in the communist movement all over the world.

The dispute is basically about the policy and the organization of the communist bloc. The Russians want a policy of "peaceful coexistence" by which they mean that they plan to bring communism to the rest of the world by use of economic pressure, educational influence, propaganda, subversion through parliamentary means, and diplomatic maneuver—all measures below the threshold of general or even most kinds of limited war, for the industrially developed Russians have a lot to lose and a full nuclear arsenal of whose terrible potential they are painfully conscious. As to the organization of the bloc, the Russians seem to want a relatively tight setup with themselves in sole ultimate control and other members playing specialized and subordinate roles within the whole. Such an organization model is appropriate to their distinctly long-range policy orientation. The Chinese, on the other hand, want a more militant, quick-result policy. They want the Russians to use their great military power in a forceful, risk-laden style of diplomacy, directed to the paralysis of Western defensive postures. And simultaneously they would like the Russians to back them in the subversion of the world, beginning with Asia, Africa, and Latin America, by means of the type of activity familiar to us from our agony in Vietnam. To go with this kind of several-balls-in-the-air strategy, Mao and his followers want a more loosely organized bloc, dominated by the dual power of themselves and the Russians and made up of relatively autarchic national units.

Whether by and large policy differences are being caused by organizational ones, or vice versa, is difficult to say. If organizational differences are regarded as prior, one then tends to explain the dispute as the outgrowth of deep historical, cultural, and institutional forces. For instance, the rather invertebrate Chinese version of the bloc (held together mostly by ideology), recalls striking features of the traditional Chinese political form, while the Russians' more vertebrate model (held together institutionally) echoes features of tsarist and Western European practice. The models of bloc structure seem also to owe something to perspectives developed from the differing historical experiences of the two communist parties in attaining power: the Chinese had a mass revolt experience, while the Russians had a more conspiratorial, manipulative one. Nationalism and national self-interest appear similarly to be reflected in the conflict, if one takes up the organizational side first. Obviously too, the Russians are rich, secure, and fat, the Chinese hungry and ambitious. On the other hand, taking policy differences as prior, we are reminded that there are indeed good reasons for such differences, apart from tradition, nationalism, and the like. Any communist in the mid-Twentieth Century would be likely to find himself in a maze of dilemmas, ideological, strategic, tactical, and organizational. The bomb, the population explosion, the growth of large organizations operating according to ahuman laws of their kind; the upheaval in Asia, Africa, Latin America; in general, the staggering complexity of modern life, national and international—these things could have created, first policy, then organizational difficulties for communists, whose naïve and restrictive ideology does not allow them breadth and flexibility of political imagination.

Undoubtedly it is useful and wise to regard the policy and the organizational differences as interactive in creating the dispute rather than attempting to work out a monistic explanation in terms of one factor or the other. Moreover, it must not be forgotten that the dispute has for sometime itself been generating factors conducive to its own survival and escalation. Perhaps the most interesting of these factors is the reaction to the dispute of the smaller satellites and communist parties outside the bloc. Many are thriving on it, for it provides them with room for maneuver in the direction of autonomy.

The Sino-Soviet rift is a complicated and fascinating phenomenon. For such a recent one, a surprisingly large number of books and articles have already been devoted to it. One of the latest and best is that by William E. Griffith, Director of the International Communism Project at the M.I.T. Center for International Studies. Dr. Griffith's book covers the dispute in great detail for most of the years 1962-1963. He analyzes it as it was manifested in the Soviet and Chinese press, in formal communications between the rivals, in verbal exchanges at communist party and front organization meetings all over the world. The Sino-Indian border war, the Cuban crisis, the test ban treaty, and the Sino-Soviet border constituted particular foci of acrimony during this period. The richness of detail, of quotation and paraphrase, the more than 200 pages of crucial documents included with the analytical study, make for a sense of concreteness and immediacy not elsewhere available. No one reading Dr. Griffith's book is likely ever again to doubt that there is a really bitter

(Continued on page 34)

Three Architects Comment On Problems of Our Time

THE expanding American city continues to spread ugliness, says a new volume of essays, The People's Architects *(University of Chicago Press, $6.95). Among the authors who discuss their role in this urban world are M.I.T.'s Dean Pietro Belluschi, I. M. Pei, '40, and John Lyon Reid, '31. Here are excerpts from their essays and drawings by Charles Schorre.*

I. M. Pei, '40

THE ANCIENT Chinese philosopher Lao-tse once remarked that the essence of a vessel is its emptiness. A city, in a sense, is a vessel, too—a container for people and for life. A city's essence, like a vessel's, also lies in its voids—its public spaces.

Most of us think of a city as a group of buildings. Yet we know from personal experiences that the real flavor of a city comes from its spaces . . . We notice that the quality of life pursued in any space has much to do with its design. Poorly designed spaces inhibit life and movement. Well-designed ones raise the ordinary rituals of life to a high level of intensity and purpose. The conclusion seems to be that a city, so far from being a cluster of buildings, is actually a sequence of spaces enclosed and defined by buildings. The thought may seem strange; yet it is, in fact, the very essence of urban design.

Today in America we stand on the threshold of an exciting era of urban planning and development. The public mind, now familiar with the splendors of Europe's cities, looks for similar beauty, spirit, and vitality in its own.

Pietro Belluschi

WHEN WE are made unhappy by the ugliness of our cities, our inner cry is for a return either to the serenity of the simple pastoral life of our forefathers or to the kind of city full of the rich and sensuous forms born in the great creative periods of the past. We seek "beauty," whatever we mean by that frayed and battle-scarred word.

We must come to the conclusion that architecture, unlike other arts, is not an escape from but an acceptance of the human condition.

To speak of architecture as an art of our time, therefore, one must think of the human condition in our time—that people, like ants, spend their working day in a conformity of pursuits in the anonymity of the great cities. The ideas of usefulness and economy prevalent in our business world have so conditioned our actions that even beauty and grace, when allowed to exist, are discreetly asked to show a return on the investment—and what is strange and encouraging is that they are beginning to do so.

In the final analysis the environment of man is the consequence of what he believes to be important . . .

THE TERM "architecture" is usually understood to apply to a building, but this is too narrow a meaning . . . I would prefer to regard "architecture" as meaning the total pattern that man creates on the earth's surface . . .

We have become quite accustomed, with the help of historians, to acquainting ourselves with the people of many historical epochs by examination and study of the architecture they produced. An examination of the architecture we are producing today . . . is not completely reassuring. If we examine critically the larger environmental complex, we are entitled to expect that the same principles of aesthetics might well apply to a region as apply to a building, and that a design incompetence that is regional in scale is no more tolerable than one that occurs in a single building. But regardless of the scale of the work, our competence to create it, to invest it with some degree of aesthetic content, and our sensitive awareness of this content are measures of how civilized we are.

John Lyon Reid, '31

Encyclopedias

AZIMOV'S BIOGRAPHICAL ENCYCLOPEDIA OF SCIENCE AND TECHNOLOGY, by Isaac Azimov *(Doubleday & Co., $8.95).*

Reviewed by Professor Emeritus B. Alden Thresher, '20.

THE INTELLIGENT, general reader, at whom this book is aimed, will find it hard to put down. While 1,015 biographical sketches of scientists can be called an "encyclopedia" only by stretching the term, it is still true that most of the giants of science are here. If the book is something less than encyclopedic in bulk, it is much more than this in its plan of organization and in its total impact. Dr. Azimov, already distinguished as a popular writer on science, has here produced a work carefully designed to orient the reader in the network of interrelationships that form the "genealogical tree" of scientific advance.

Isaac Azimov
Genealogist of Science

No other work does precisely this. The conventional histories of particular sciences, confined as they are between conventional boundaries, necessarily miss influences which cut across the fences between disciplines. The scholarly monographs in the history of science dig much deeper, but usually within a narrow compass, while the true encyclopedias or dictionaries of biography emphasize only occasionally and incidentally the scientific "ancestors" and "descendants" of a particular investigator. Azimov focusses attention upon this network of relationships as a leading feature of his exposition. His stress upon this aspect constitutes the central creative contribution of the work.

The arrangement is approximately chronological, so that the book may be read through very agreeably as almost a narrative history of science but with a biographical emphasis. It can serve also as a reference work, the kind that woos the reader to go on in several directions from any given point at which he may happen to dip in. Confirmed "dictionary readers" will jump at this opportunity. Yet the arrangement is not strictly chronological, so that he is able to group related men together even though they are not precisely contemporary. Thus it is sensible for Celsius to adjoin Fahrenheit though they were 15 years apart in birth. Each name is cross-indexed so that one can quickly locate, for example, not only the sketch of James Clerk Maxwell, but also those of some 21 predecessors, contemporaries, and successors whose work is interwoven with his.

These interrelationships are sometimes charged with drama as, for example, on that day when Karl von Nägeli, a biologist of some reputation in the early 1860's, received a paper from an unknown amateur biologist, an Augustinian monk named Gregor Mendel, did not understand or appreciate it, and returned it with brief and cold comments. As a result, "Darwin died in 1882, never knowing that the greatest weakness in his theory had been patched up. Mendel died in 1884, lonely and saddened, never suspecting that he would be famous. Nägeli died in 1891 never dreaming what a terrible mistake he had made. In 1900 De Vries came across Mendel's paper, and what are now known as the Mendelian laws of inheritance were finally brought to the notice of the scientific world a full generation after their discovery."

Azimov's admirable prose style contributes much to the merit of the book. Direct, unpretentious, transparent, it drives to the gist of the matter in plain declarative sentences. An occasional anecdote or colloquialism strengthens one's suspicion that these people were intensely human, often weak, and sometimes touched with grandeur.

The author of a book of this kind faces problems of selection and categorization that are so baffling as to be insoluble on any completely logical basis. We must accept cheerfully the author's compromises on the understanding that he is engaged in producing what is in reality a work of art, not an inventory or catalogue, or even a monograph subject to the standards of rigorous research. One does not compile this kind of a book; one creates it. The reader could quarrel endlessly about any such selection of names—why was *X* included, when *Y*, who was left out, was the greater man? Azimov disarms his critics at the outset by taking full responsibility for his selection as a personal one, and by admitting frankly that as a biochemist he tends to stress the fields he knows best. We do, in fact, observe a certain thinness of representation in some areas such as the earth sciences.

A cognate problem is where one is to draw the line between science, properly so-called, and all the manifold aspects of human endeavor that are entangled with it. One can discover a continuous gradation from the quintessential "pure" scientist through innumerable engineers, inventors, industrialists, teachers, artists, physicians, and explorers. Should Henry Ford, more industrialist than technologist, be included, while Roebling, a great innovating engineer, is omitted? Does Cyrus Field, who after all only promoted and financed the Atlantic cable, deserve a place in preference to Matthew Boulton, without whose business acumen James Watt's efforts might have come to nought? Was Audubon at heart more artist than ornithologist? Is a pioneer astronaut—or for that matter an architect—a scientist at all? Such questions, though unanswerable, are only quibbles; and they become trivial by comparison with the positive impact of such a book. In a popular work the wise decision is to let the categories range broadly.

One of the charms of a study which like this one reaches well back into the area of "little science" (in

This is the last year in which students will browse in the elbow of the Harvard Coop's Technology Store shown above.

The Coop is preparing to move into the new Student Center and greatly enlarge its book section in the coming year.

Derek Price's sense of the term) is that the people engaged in science in these epochs did it out of sheer fascination for the subject, and more often than not had to earn their living in other ways. Medicine and the work of the apothecary are historically two of the major "nurse" professions which people of scientific inclination could carry on for grocery money, while pursuing investigations that were often, but by no means always, cognate with the subject matter of these professions. Many of the great Nineteenth Century German chemists started as apothecaries.

In Azimov's list each man is given, for convenience, a single or double tag: for example, Scheele is labeled a "Swedish chemist," while Whitehead is an "English mathematician and philosopher." A rough count of these cognomens shows 103 "astronomers" and 10 for whom the "astronomer" tag is combined with another designation. There are 39 "physicians" and seven more "physicians plus something else." There is only one "parapsychologist" (J. B. Rhines), and our author seems decorously to hold his nose as he writes about this controversial investigator. All together there are well over 100 of these single or double appellations in the list. To realize how complex and insoluble the problems of such categorization are, one need only reflect that this number could easily be either halved or doubled without doing violence to the appropriateness of any one of the descriptions. The categories, furthermore, include not only such obvious ones from earlier centuries as alchemist, philosopher, and scholar, but also theologian, poet, artist, prince, cardinal, and traveler. One is tempted to wonder whether a new *Azimov,* a century hence, will show innumerable finer degrees of specialization, or, on the contrary, whether the interdisciplinary tendencies now gaining ground may make many current specialties obsolete and set up broader categorizations. Whatever the outcome, Azimov's genealogical tree will stand as a contribution to humane scholarship with a strong appeal to the many readers whose world view must inevitably include some conspectus of science and its meaning for human affairs, and who find it impossible to put any wall between the "two cultures."

THE FOCAL ENCYLOPEDIA OF PHOTOGRAPHY, edited by Frederick Purves *(Focal Press Ltd., London, $20).*

Reviewed by Henry B. Kane, '24

HERE IS a monumental book. From "A. Prefix to convey negation," to "Zoom lens," it attempts in 1,298 pages to cover the entire field of photography. Its publishers claim it is a complete photographic library in itself, and they are very nearly correct. At least it serves as an introduction to all aspects of photography, which is about all any encyclopedia can hope to do.

This is a British book and its long list of writers is preponderantly British, but there is a good sprinkling of representatives of other countries. The article on Stroboscopic Flash, for example, is written by the world's leading expert on the subject, Harold E. Edgerton, '27. Profusely illustrated with both diagrams and photographs, this should be a worth-while addition to the library of any serious photographer.

The Theater

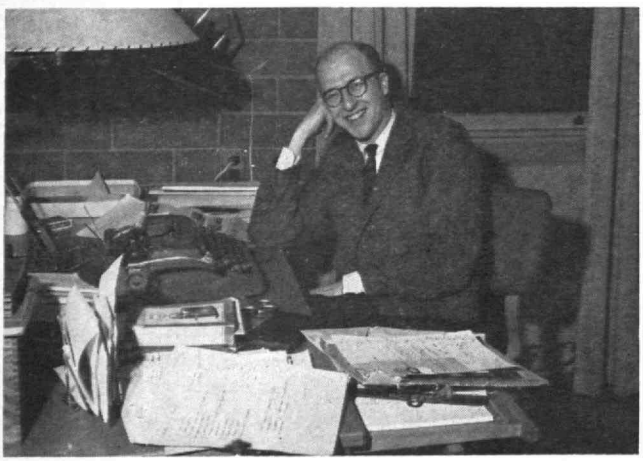
How to Enjoy Shakespeare

By Norman N. Holland, '47

THE PARAGRAPHS which follow are from The Shakespearean Imagination *(The Macmillan Company, $7.50).*

THE TWENTIETH CENTURY, in such matters as editing and staging, developed a new respect for Shakespeare's language. In criticism (which we can define as understanding and evaluating the plays—in that order), two schools of thought have dominated: the "historical" critics and the so-called "new" critics. The historical critic holds, as his basic axiom, that the way to read a writer from the past (like Shakespeare) is to put yourself in the position of his own original audience: try to know what they knew, feel as they felt, think as they thought. The "new" critic takes the opposite tack: the modern reader should put all matters of biography, history, intention, evaluation, and background aside until he has pondered the text by itself with all the Twentieth-Century care, intelligence, and feeling he can muster. These two approaches squarely contradict each other in theory. In practice, however, they work out to much the same thing: a historical critic tries to read with all the skill and imagination the new critic would like him to use; the new critic (on the sly, as it were) corrects his reading of the text in isolation by his (bootlegged?) knowledge of what an Elizabethan play is likely to contain. Both schools of thought embody that most distinctive trait of all Twentieth-Century thinking (not just Shakespeare criticism): concern for language. Both schools of thought recognize that . . . our minds responding to Shakespeare's language are his real theater. . . .

At the age of six or thereabouts, most of us were taken by the hand and led to school where we were taught "how to read." More exactly, we were taught how to put letters together to form words and told we knew how to read. Essentially, what we learned to read was a sequence of words: a simple story or a progression of ideas. Reading literature or "seeing" literature in the form of a play or film, however, calls for something more. Good reading or good seeing, the "new" critic says, proceeds first and foremost by paying close attention to the work itself, putting aside value judgments and matters of biography or historical background until we have really understood the words themselves. There is a second basic principle of good reading—you might call it giving the author the benefit of the doubt: unless or until it is proved otherwise, assume that every detail in a work of literature serves a purpose, serves in one or more ways to add to the organic unity of the whole. Just as a child reads letters together to form words, so a more mature reader uses his skill and imagination to put details together to form an artistic totality.



Norman N. Holland, '47, Associate Professor of English.

Details act together in two basic ways: by likeness or difference, that is, by repetition or contrast, but there are literally myriads of possible variations. Key words can be repeated; the plot in a narrative may be echoed in a subplot, in "comic relief," or in figures of speech; characters may be presented in terms of symbols; even plot techniques (surprise, anticlimax, and the like) or methods of characterization (as by occupation or bodily detail) or the use of certain sounds in a poem or certain rhetorical figures, even these mere techniques can be used as meaningful elements. One can see these patterns only by looking at the work itself, keeping in mind the basic assumption that all these details probably will come together into an artistic wholeness. It is sometimes helpful to look first at what seems to fit in least well; because such elements are "farther away" from the center of a work, they often add most to it. For example, in a Shakespearean tragedy, the comic scenes often tell us most about the play as a whole. In every case, though, this kind of reading or seeing demands an imaginative effort to get the sudden intuitive understanding of likenesses that underlies seeming difference, the same kind of imaginative leap that any discovery requires. These imaginative graspings, these sudden awarenesses of the infinite variety of things "going on," are what give that marvelous sense of enlarging the mind and feelings which is the peculiar and special pleasure of literature.

A work of literature with a story (for example, a novel or a play or a film) makes a special, double demand on its audience because every element in it can serve in two ways. In a sense, one can think of literature-with-a-story as proceeding detail by detail, episode by episode, effect following cause, along the circumference of a circle. Each element of the work is related sequentially to the one before it and the one after it in the story. At the same time, each element is related to all the others at once by the shape or style

(Concluded on page 47)

How to Conquer Words

Divide the job of writing a technical report into two parts, and test your encoding on others, an M.I.T. teacher suggests

By Robert R. Rathbone

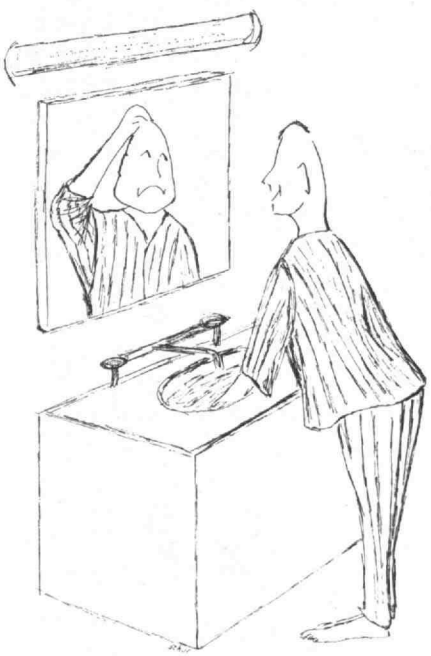
With sketches by Susan E. Schur, '60

Translating thought symbols into words is simple. . . . Describe a spiral staircase, you say? . . . Well, it's one that goes . . .

ONCE YOU realize that you can produce a successful communication only if you first learn to communicate with yourself, you are on the way to becoming a good report writer. You then will have a feel for handling the choices you meet at every turn and for applying the rules of writing that heretofore may not have made much sense to you.

Practically all writers have some trouble converting thought symbols into written words that accurately represent the intended message. The major source of their problem is the semantic noise created by the structure of the English language—its vocabulary, its grammar, its idioms, its conventions.

Inexperienced writers in particular find it very difficult to go from an outline to polished prose with any degree of grace and ease. Most of them try to do too much in one step: choose the exact word; check for proper spelling and punctuation; test each sentence for balance, flow, and stylistic effect; and decide on all the mechanical matters of format. Since noise engenders noise, the cumulative effect is to produce *thesis paresis* or "writer's block."



Mirror, mirror, on the wall, Can I explain $E=mc^2$ to all?

We suggest that a practical substitute for experience is to divide the job of transcribing symbols into two operations: writing the draft, and revising. In essence this optimizes the functions of the encoder and the transmitter.

Writing the Draft

Writing a rough draft will enable you to transcribe notes into prose without having to worry about the refinements of language and usage, and the mechanics of composition and spelling. With it, you put your story together from beginning to end for that all-important first time. And you do it quickly, without stopping to doctor a sentence here and a word there, because you realize that you are not producing a final version.

If your outline has entries that represent topic sentences of paragraphs, you simply have to talk your way through the outline. It will tell you what to say and the order in which to say it. You provide the continuity, or flow to your story as you unfold it.

Since the idea is to get through the draft as though you were giving a talk from notes, we suggest that you try dictation. Any dictating system that frees you from the physical act of writing will do.

Try to write without focusing your attention on the written words in front of you. (If you do both you are acting as transmitter and receiver simultaneously and may create undesirable feedback.) Concentrate on telling the story as though you were face to face with your intended reader. Say the words aloud if you wish. When you have to pause to think, don't look at what you have written unless you need a few words to help you start. If you read any more than that, you may stop to rewrite and this maneuver decreases the value of the draft.

When you finish, arrange to have a fresh copy typed. Ask the typist to leave wide margins and to triple space the text. You will then have a clean, uncluttered manuscript to work with.

Reviewing the Draft

The following notes on procedure should help you develop an effective technique for reviewing your draft.

1. Don't begin to revise the moment you finish writing. You have a much better chance of putting your-

(Concluded on page 40)

PROFESSOR RATHBONE *is nationally famous as a teacher of technical writing. This article was drawn from* Engineering Communications, *by Rosenstein, Rathbone, and Schneerer (Prentice-Hall, Inc., $2.95, Paperback).*

How Scientific Economics Began

Revolutionary labors of practical mercenary men in England led to invention of a social science

WILLIAM LETWIN, Associate Professor of Industrial History at M.I.T., introduces a fascinating set of characters—whose very names will be new to many readers —in The Origins of Scientific Economics, *published last year (Doubleday) & Co., $5.75). Their roles are explained in the book's preface as follows:*

THE POPULAR NOTION that Adam Smith invented economics has always discomfited those historians of economic thought who, like all true historians, feel a strong urge to trace things back to their utmost beginnings. The work of discovering origins that predate the apparent original was begun soon after Smith's time by such of his followers as James Mill and J. R. McCulloch. Being inclined to view economic theory as a particularly elegant way of demonstrating the merits of *laissez faire,* they concluded that whoever advocated free trade must be something of an economist, and they located several writers during the Seventeenth and early Eighteenth Centuries who had advocated it so forcefully as to qualify them, in their eyes, as considerable economists. As economics became more elaborate and refined, interest in its history became more intense, and the historians slowly succeeded in proving that not only medieval churchmen, moralists, and merchants, but even ancient philosophers had commented on economic matters. More recently still, some have penetrated beyond classical antiquity to find that ancient Chinese sages and Babylonian lawgivers made wise pronouncements on economic subjects. Having by now located the beginning of economics at the very beginning of history, they rested confident of having achieved their calling's highest goals.

The resting place, though convenient, is ill-chosen; the historians both halted too soon and went too far. In a sense economics has always been known. It is so vital in the life of merchants, moralists, and statesmen that they could never have done their work without understanding its basic principles. In the same way, builders have always known physics. Most men, of course, know such things without being aware that they know them. Some few may become conscious of fragments of their knowledge and may make incidental remarks that can be recognized as striking foresights by anyone who is searching for such prodigies. But great skill and wise insights existed long before science, and neither makes up science. The science of economics, like all sciences, had to be created.

The distinguishing characteristics of a science is that it is an explanatory system. It rests on a small number of principles. It is capable of explaining, or predicting, many diverse phenomena of a certain sort. It accounts for them by tracing them logically (or, what is equivalent, mathematically) to the restricted group of principles or laws. All such explanatory systems are scientific theories, even though they may vary widely in their quality. A theory that cannot predict accurately or explain thoroughly will nevertheless still be a scientific theory, though a poor one, if only it is of the proper form. Some particular economic theory, for instance, may be weak because it explains wages but not the level of employment; it may be imprecise because it predicts that in certain circumstances wages will rise but cannot tell by how much; but if the explanation and prediction follow necessarily from a few principles that explain many other phenomena as well, it is nevertheless a scientific theory. On the other hand, the mere isolated statement of one of those principles, or even an exhaustive list of all of them, is not a scientific theory, any more than a long career of astute guesses shows that a capable businessman who made them was instructed in economic theory.

A scientific theory, being a system, cannot grow by mere idle accumulation, but must be produced by an act of invention. There can be no period when a science is partly in existence: someone either has or has not brought together into an orderly whole enough principles and effects to qualify as a science, however rudimentary and fallacious. In the case of economics, although its fundamental principles had all been dimly recognized for centuries, the connections between them and their logical implications were not set down until the end of the Seventeenth Century. Then, as is often the case with inventions, a number of men devised slightly different but basically similar theories within a few decades. Before 1660 economics did not exist; by 1776 it existed in profusion.

It would seem quite natural that the invention should have taken place at the end of the Seventeenth Century, and in England, since seldom has a community been so fervently interested in both trade and science. But this plausible surmise has little to do with explaining the rise of scientific economics. For it is remarkable that the inventors had none of that detached objectivity that goes by the name of "scientific attitude." They created scientific theories, yet they generally did not do so deliberately, nor did they do it even for the sake of knowledge, but rather their scientific accomplishments were a by-product of their efforts to convince others to accede to certain economic policies.

A Ship Twice Lost and Found

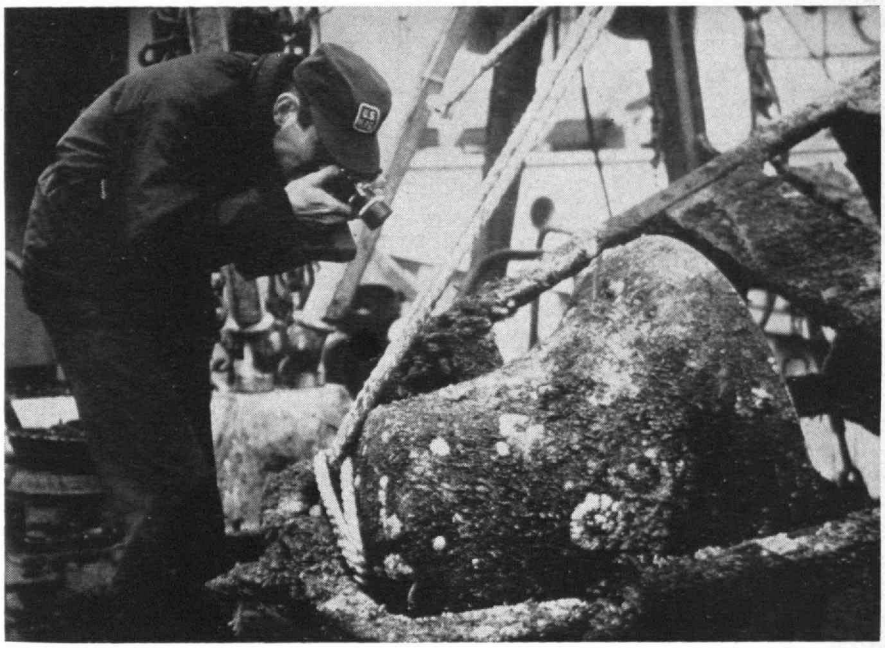
How a determined skin diver and an ingenious M.I.T. professor brought a lightship lost 20 years ago back into the limelight

By Captain Harold Payson, Jr., U.S.N. (Ret.)

IN SEPTEMBER, 1963, almost 19 years to the day after the lightship *Vineyard Sound* was lost, she was located a second time and identified on the bottom of Buzzards Bay. So much effort was expended that summer in the search for the submarine *Thresher* that scant notice could be paid to the finding of an old light vessel, once affectionately known as "The Sow and Pigs." That unusual achievement, however, merits reporting in some detail.

At midnight of 14-15 September, 1944, the eye of a tropical storm passed over Providence, R.I., heading northeastward. Soon thereafter, it changed course unexpectedly to a more southeasterly direction and roared out to sea over Buzzards Bay. Hurricanes were not named in those days, but the 1944 version was a whopper and probably packed more energy than any storm recorded before or since. Extensive precautionary measures greatly reduced property damage and, at first, it was thought that the lives lost in New England would not exceed 10. Then, on September 17, the Coast Guard announced that the *Vineyard Sound*, with her crew of 12 officers and men, was missing from her mooring off the southeast tip of Cuttyhunk Island. Her Executive Officer, Chief Boatswain's Mate A. F. Love, and four other members of the crew were on compensatory leave at the time.

The iron hull of the *Vineyard Sound*, No. 73, had been launched at Baltimore, Md., in 1901. She was 123′ 9″ in length, had a displacement of 693 tons, and was powered by a 400-hp steam engine. She had undergone a thorough overhaul at Chelsea prior to the storm. She was equipped with a radio telephone but was apparently unable to communicate her predicament in time for help.



The bell from the "Vineyard Sound" as recovered by Diver Bradford W. Luther, Jr.

During the height of the storm, the acting commanding officer of the *Hen and Chickens* lightship, No. 86, Coxswain A. M. Wallace, saw red and white flares, while coastguardmen and fishermen at Westport, Mass., about 10 miles from the lightship's station, saw very bright white lights in the sky over her anchorage and debated as to whether they were lightning flashes or distress signals. The fury of the hurricane prevented these men from approaching close to the beach and, consequently, it was not until several hours later that, with the aid of glasses, they were able to see that *Vineyard Sound* was not at her accustomed place.

Three other United States ships went down in the same storm: the destroyer leader *Warrington* and the Coast Guard patrol boats, *Bedloe* and *Jackson,* who had gone to the assistance of a torpedoed Liberty ship off the North Carolina coast.

The Coast Guard began an intensive search by sea and air as soon as No. 73 was missed on the morning of the 15th. The first plane out was an amphibian from Salem, under Commander Northern Air Patrol. Within two days, bits of wreckage from the missing ship and the bodies of the ship's cook and a seaman were recovered, and Mr. Love identified them.

At noon of the 20th, the Board of Investigation met on the Navy *YDT-1,* which by then had located and was moored directly over the sunken lightship. Three divers from the Navy Torpedo Station Diving Detail were called as witnesses and described their descent to the vessel. One of them, Nelson H. Dover, Gunner's Mate first class, USN, testified:

CAPTAIN PAYSON received a master's degree in oceanography at M.I.T. in 1963 and is now a doctoral candidate, associated with the Boston Harbor Project.

"I landed on the bottom on a mushroom anchor and went aft along the side to see if I could find any lettering or numbers or names, but I couldn't see as there was no visibility outside of three feet. . . . Next I came out of the deck house and encountered, aft about three more feet, a bell. I don't remember the numbers on the bell. (Witness uses written report to refresh memory.) They were the letters USLHE and the number 1981 (possibly 1901). On my investigation, I saw the forward mast was carried away about one foot above the deck. Next I went aft to a small deck house and investigated the after mast. This mast also carried away off the deck. I went forward and investigated the stack. The stack was carried away. Just forward of the stack were two ventilators. That's about it. I brought up two battle lights." Another diver disconnected the bell rope and brought it up. Mr. Love recognized it and stated that he had painted it (white) and replaced it himself.

In the Course of Time

As a result of the investigation, the Board determined: that Lightship No. 73 had foundered and lay on an even keel in 70 feet of water, bearing 308 degrees T, 1.3 miles from its assigned station; that the mooring chain was buried in the sand, and that the harbor anchor was secure. The Board was of the opinion that a leak in the hull through some undetermined point caused the foundering of the vessel and recommended that she be stricken from the record of public property. Thereafter, as World War II drew to a close and reconstruction began, she was practically forgotten.

Skin diving clubs blossomed after the war, however, and their members combed the depths for wrecks and treasure. Skin divers made a number of attempts to find the *Vineyard Sound* again but without success. She did not seem to be where the wreck symbol on C and GS chart No. 1210 indicated she should be. Probably the divers were never too sure of their own positions, which were difficult to pinpoint from a small boat in that area. The latest plot of her position on the above chart shows her only 100 yards or so west of the wreck symbol.

Meanwhile, young Bradford W. Luther, Jr. became president of the Fairhaven Whalers Skin Diving Club and he set himself the task of finding the *Vineyard Sound.* It might be a lifelong quest but he was determined. In the 1950's and early 1960's, his club had dived on many other wrecks, among them the destroyer *Saint Clair,* the freighters *Belville, Port Hunter, Herman Winter, Dixie Sword,* and the schooners *Pottstown, Lunet, Gem* and *Thomas Lawrence.* The positions of these were fairly well known and an abundance of buoys and land ranges made locating them comparatively easy for the divers, whose air supply and time were always limited.

Construction of the Buzzards Bay Tower greatly facilitated position keeping south and west of Cuttyhunk. With this new aid to navigation at hand, and encouraged by the mild spring of 1963, Luther and his divers began searching in earnest for the lightship. Using twin trawl doors constructed by Luther, they attempted a few sweeps the first week in July with no success. Subsequent planting of lobster pots in the search area made further sweeping impossible.

Fortunately, at about this time, Harold E. Edgerton, '27, Professor of Electrical Measurements at M.I.T., was testing a sonar device he had been working on for several years. There is nothing he likes better than looking for wrecks, so he was off in a flash when he heard of the divers' need for help. Here was an ideal opportunity to make a shallow water test at sea of the side-searching sonar. Progress in the development of this equipment was particularly important at the time because a similar model was being used in the search for the *Thresher.*

How the Probe Works

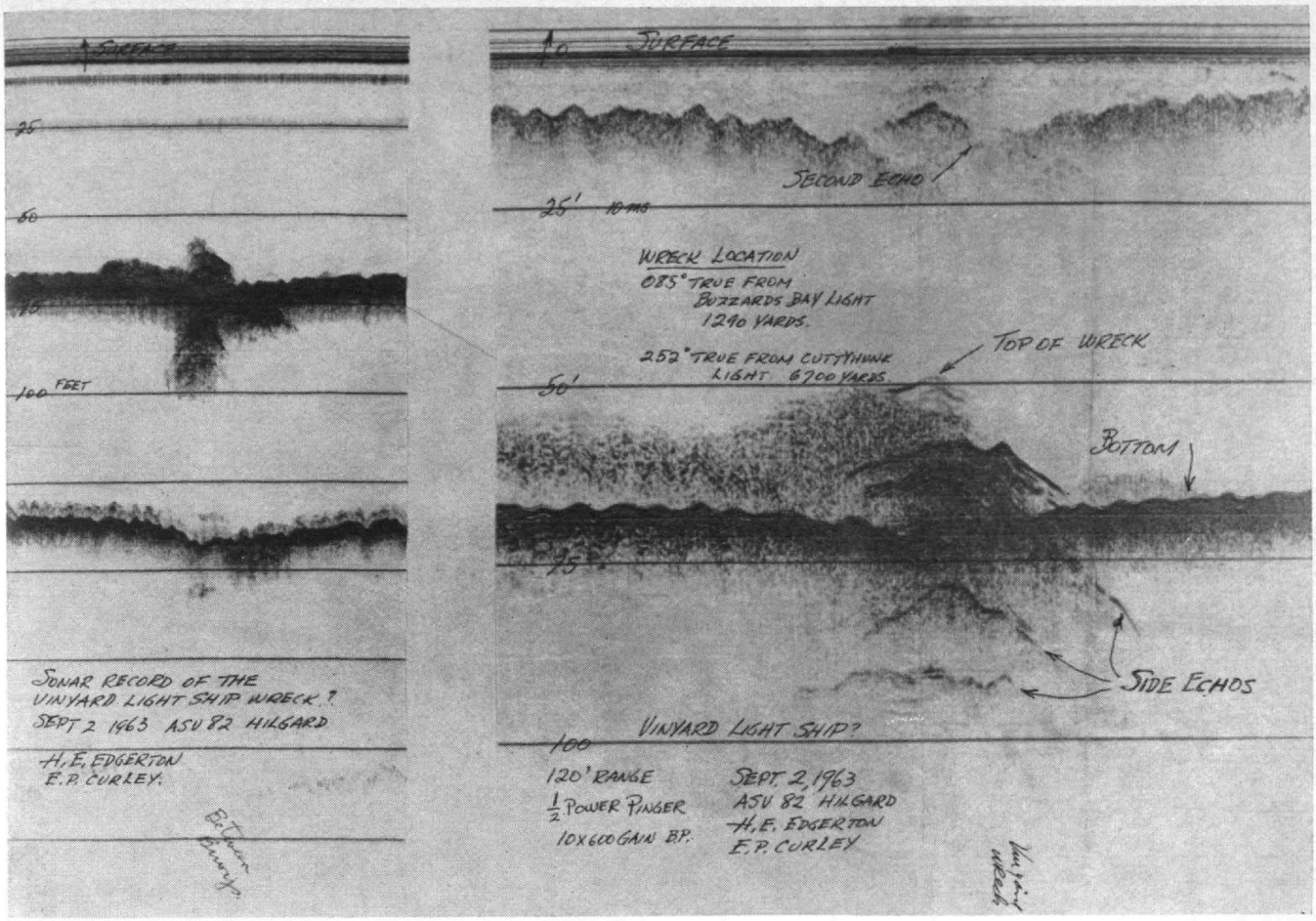
The Edgerton Pinger Probe has evolved from the E. G. and G. Sonar Pinger for positioning deep-sea cameras and is especially designed to penetrate unconsolidated sediments at the bottom of rivers, harbors, and coast lines. By merely turning the transducer 90 degrees, the device can be changed to a side-searching sonar, capable of receiving echoes from small objects out to 1,000 feet or more. The equipment needs no drydocking for installation and is fully portable. It can be operated from boats as small as 14 feet and driven by a 500-watt motor-generator. It operates at a frequency of 12 kc, with a short acoustic pulse and high peak power (0.1 to 0.5 ms, 108 db). The pulse rate may be as high as 30 cps.

Four major components make up the system: a sonar trans-driver marking amplifier, high resolution Alden recorder, and a submersible transducer. The author has carried the whole works, plus the generator and gas cans, from Boston to Newport and back, in a VW sedan. Once the pinger fish is hung over the side of the boat and the pinger started, a continuous record, vertical or horizontal, is kept on Alden chemically treated paper by the recorder. This makes it possible for an observer to recognize weak signals which might be missed in the glass of a scope.

At the time of the divers' plight, a Coast and Geodetic survey team was berthed in Fairhaven for the purpose of taking a new look at the charted wrecks. They were most receptive to the idea of making a sonar sweep for the *Vineyard Sound,* and arrangements were made with Lieutenant Commander E. K. McCaffrey and Lieutenant J. S. Midgeley, commanding officers of the USCGS ships *Wainwright* (ASV 83) and *Hilgard* (ASV 82), respectively, to transport Professor Edgerton and his gear to the wreck site. Ably assisting in the search were Edward P. Curley, who built the recording equipment, and John A. Yules, '63, a graduate student in oceanography at M.I.T.

On August 30, the *Wainwright* put to sea and began her first sonar sweep from the previous position of the lightship, her old station. Today a lighted buoy marks the spot. A moderate swell was running and thick fog was rolling in. On a course consistent with the southerly winds of the 1944 hurricane, *Wainwright* moved slowly in a northerly direction. When about due east of the Buzzards Bay Tower, the recorder indicated a strong echo from a submerged object at a range of approximately half a mile from the tower. If this were the object of the search, there was no way of fixing its position accurately in the exasperating fog. Noting their estimated position, the party returned to port.

Fair weather three days later made possible a resumption of the search by the *Hilgard* which produced highly gratifying results. Sweep runs were



A vertical recording of the target made by Dr. Edgerton as he passed over the wreck hidden by about 70 feet of water.

made to the south, east, and north, with the sonar scanning to port, and the range to the object was found to be about 220 feet abeam on the south leg and 550 feet on the north leg of the search pattern. With both the north and south legs buoyed, it was a simple matter for Dr. Edgerton to turn his transducer downward and obtain a vertical recording of the target as he directed *Hilgard* to pass over it. This showed the object to lie in about 70 feet of water and gave her exact position as fixed visually on September 2.

High hopes and painful curiosity could not be satisfied for a whole week thereafter. A colored plastic bottle anchored over the wreck disappeared and a severe nor'easter blew in. Nevertheless, on the ninth, in calm but foggy weather, Luther and his friends resumed operations in their own 16-foot boat, *Flipper Jr.* Proceeding first to the tower and thence on a timed compass run to the area of the submerged object, they anchored a buoy and rigged the trawl doors. On the second swing around the buoy, the sweep line caught and held fast. Brad Luther began his first dive almost immediately. Later, he described it in these words, especially interesting because of their similarity to those of Dover 19 years before:

"I descended down the west drag line, which had been hauled in, leaving 100 feet on the bottom lest it slip off, and secured on the stern cleat. A slight current was running but nothing that would bother divers. I really expected to find that the sweep line had encountered anything but what we had been searching for so long. My first sight of the object was the bronze quadrant and the fantail of a vessel. The drag line had fouled on a starboard rail stanchion. A quick glance toward the center line of the hull convinced me that the wreck was there. . . . The sweep line was caught around a structure on the top of a mast (lying on the bottom beside the hull). Here was the first indication that we had indeed located the *Vineyard* lightship. On top of the tubular steel mast, with its attached ladder, was the Fresnel lens of the masthead beacon. Surrounding the light, at the base, was the platform and railing where the sailors stood while cleaning the glass. The stub of the mast led back toward the wreck."

Luther's dive left no doubt as to identification of the wreck. Recovery of her bell, binnacle, and other articles, since, provides proof to the most skeptical. (The bell was given to the Cape Cod National Seashore Maritime and Coast Guard Museum at Nauset Light.)

The cause of the lightship's demise may still remain a riddle. One is tempted to blame it on the emergency mushroom anchor, which appears to have swung against the bow plating and stove it in, but it is just possible that the anchor punctured the skin after the ship settled and leaned against it on the bottom. Luther could not see, initially, whether or not the regular mooring anchor was still attached to the anchor chain. He has since ascertained that the chain leads from the hawse pipe straight down into the sand and has not been able to follow it away from the hull. More dives are planned for the future and, it is hoped, will ultimately reveal the complete explanation of the disaster.

and probably unbridgeable rift between the Russians and the Chinese. Moreover, he will find here plenty of materials and incisive analytical insight on the basis of which to form his own view of factors that made the dispute possible and which continue to enhance it.

Unfortunately these virtues of *The Sino-Soviet Rift* are attained at some cost. The general reader in particular will probably find this book a little tough going. The amount of detail is rather overwhelming. Dr. Griffith is obviously unusually well equipped to tell us, in convincingly solid detail, about the rift. He is particularly knowledgeable and keen on the small satellites' and nonbloc parties' maneuvering within it. His nonspecialist reader may well wish, however, that the author had oftener remembered that this is a problem affecting the future of men in general and that they are entitled to more than a chance to look over the learned professor's shoulder.

MATHEMATICS: ITS CONTENT, METHODS AND MEANING, edited by A. D. Aleksandrov, A. N. Kolmogorov, and M. A. Lavrent'ev; translation editor, S. M. Gould; 3 volumes, 1,152 pages *(The M.I.T. Press, $30).*

Reviewed by Professor Emeritus Philip Franklin.

THIS is a comprehensive survey of elementary and advanced mathematics. The initial chapters are accessible to any reader familiar with high school mathematics. The later chapters assume a knowledge of calculus and require close attention from a serious reader. These chapters also contain much material of interest to a mathematician or mathematically inclined scientist.

The original organization and writing of this work involved a large group of Russian mathematicians, all competent, and many of great eminence. These men collaborated in such a way that the principal writer of each section had the benefit of suggestions and criticism from many colleagues. Their objective was an exposition of many mathematical disciplines addressed to a wide circle of the Soviet intelligentsia.

The American Mathematical Society considered the quality of exposition such as to justify a translation, aided by a grant of the National Science Foundation. This makes the work accessible to the "educated layman" of the English-speaking world.

The choice of topics is ambitious, but commendable. It includes most of the important fields founded in the Nineteenth Century and extended since then, as well as some representative of Twentieth Century mathematics such as computing machines, topology, and algebraic systems.

The scope of material treated, and the different levels of mathematical sophistication, inevitably mean that some parts of the text will not suit all readers. But, subject to such reservations, the reviewer finds this an admirable survey of present-day mathematics. The translation should be useful to many readers who earnestly desire to extend their acquaintance with mathematics.

NUCLEAR POWER, U.S.A., by Walter H. Zinn, Frank K. Pittman, '41, and John F. Hogerton *(McGraw-Hill Book Company, $18).*

Reviewed by Professor Manson Benedict, '32.

THIS VOLUME is one of a series of four prepared by the U.S. Atomic Energy Commission for distribution to official delegates at the Third International Conference on the Peaceful Uses of Atomic Energy held under United Nations auspices in Geneva in September, 1964. It is a concise yet complete survey of the development of the peaceful uses of nuclear power in the United States. Principal emphasis is placed on nuclear power plants for central station generation of electricity, but brief descriptions are also given of other uses being developed, such as radioisotopic power plants for remote weather stations, nuclear rocket engines for space propulsion, and nuclear heat sources for sea-water distillation.

The authors were uniquely qualified for their task. Dr. Zinn has been continuously engaged in developing nuclear reactors since, as Enrico Fermi's collaborator, he directed construction of the world's first nuclear chain reactor in the squash court at the University of Chicago in 1942. Dr. Pittman has been in the atomic energy program since 1946 and served as director of Reactor Development for the AEC from 1958 to 1964. Mr. Hogerton is a writer on scientific and engineering subjects with special knowledge of the nuclear field. These men have written an authoritative account of U. S. accomplishments in the development of nuclear power, and give a balanced appraisal of the future prospects for this new and important energy source.

The book will be of interest both to the intelligent layman who wishes to learn the main outlines of this country's civilian nuclear power program and to the specialist who wishes to have a convenient source of information on the principal features of the many U.S. nuclear power projects. The writing is clear, concise, and accurate. The book is profusely illustrated with photographs, many of which are beautiful and all of which were well selected for the story they tell. The entire work is an impressive achievement, almost a little masterpiece.

Mainly for Specialists

RECENT BOOKS likely to be of especial interest to some M.I.T. Alumni have included:

Personality and Culture in Eastern European Politics, by Dinko Tomasic of Indiana University (George W. Stewart, Publisher, Inc., $3.75).

Progress in Biocybernetics (Vol. 1), edited by the late Norbert Wiener and J. P. Schade of Amsterdam (American Elsevier, $13), and *Progress in Brain Research* (Vol. 2) with the same editors (American Elsevier, $15).

Social Order and the Risks of War, by Hans Speier of the Rand Corporation (George W. Stewart, Publisher, Inc., $4.75).

(Concluded on page 44)

The shock waves of sudden stops and eddy currents around slow vehicles are elements of traffic flow studied by IBM

There's a variety of mathematical problems at IBM. For example, mathematical models, using concepts from various subjects such as fluid mechanics, are being applied to the study of vehicular traffic flow. The variational calculus is used to study high-frequency vibrations in crystals. Non-linear free boundary problems have been solved for dipping electrical connections into a hot solder bath.

Applied Mathematics at IBM is an intriguing area in which mathematical theory and new applications often develop out of the same problem. The problems may range from structural mechanics to solid state physics and electrocardiogram research.

There are many opportunities for interdisciplinary study in science and engineering, management and operations research, or computing and programming. For a broader scope of problems to solve, write to Manager of Employment, Dept. 615B, IBM Corporate Headquarters, Armonk, New York 10504.

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Individuals Noteworthy

(Continued from page 8)

Edwin B. Wilson: 1879-1964

A MEMBER of the M.I.T. Faculty from 1907 to 1922, Professor Edwin Bidwell Wilson died on December 28. He retired from the Harvard School of Public Health in 1945, but had since been active in research for the Navy. He was a former vice-president of the National Academy of Sciences, president of the Social Science Research Council, the American Statistical Association, and the American Academy of Arts and Sciences, and chairman of the American Society for the Control of Cancer.

At M.I.T. Professor Wilson was head of the Physics Department and helped to develop a department for research and instruction in aeronautics. After the death of President Maclaurin, he served from 1920 to 1922 as a member of an Administrative Committee, composed of three Faculty members, which assumed the functions of the Institute presidency until the appointment of President Samuel W. Stratton.

Edwin B. Wilson

New Director

THOMAS YONKER, '56, has succeeded Lamar Washington, '56, as Director of the M.I.T. Associates Office. Mr. Yonker has been in the Industrial Liaison Office since 1961, and previously was with the AiResearch Division of the Garrett Corporation in Phoenix, Ariz. Mr. Washington plans to establish a private consulting practice.

The M.I.T. Associates Office facilitates collaboration between the Institute and selected business and industrial firms.

In Educational Council

WILLIAM H. MCTIGUE, JR., '54, has been appointed to succeed D. Hugh Darden as Executive Secretary of the M.I.T. Educational Council. He will also serve as Associate Director of Admissions.

As a civil engineer interested in heavy construction work, he has worked for the DEW Line Division of the Federal Electric Corporation and the Moretrench Corporation.

Mr. McTigue captained the Institute crew that raced at Henley in his senior year. He later served in Greenland with the U.S. Army Corps of Engineers, and in 1962 received an S.M. degree from the Newark College of Engineering.

Physics Professor

ICKO IBEN, JR., an astrophysicist, has been appointed associate professor in the M.I.T. Department of Physics. He is a Harvard graduate, with a Ph.D. from the University of Illinois, who has taught at Williams and since 1961 has been a senior research fellow at the California Institute of Technology.

(Concluded on page 39)

The Personal Business of The Business Executive

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Individuals Noteworthy

(Concluded from page 36)

New Posts

NAMED in the news of promotions, elections, and appointments recently were:

Augustus B. Kinzel, '21, as Vice-chairman, New York State Science and Technology Foundation . . . *Walter E. Lobo, '26,* as President, United Engineering Trustees, Inc. . . . *Daniel Silverman, '29,* as Research Consultant, Research Department, Pan American Petroleum Corporation;

Amasa G. Smith, '29, as Vice-president, Chicago Bridge and Iron Company . . . *Sidney L. Kaye, '30,* as President, Suffolk Grocery Company, Inc. and as a Director, Commonwealth National Bank, Boston . . . *Robert C. Becker, '34,* as Assistant Vice-president, Andes Copper Mining Company and Chile Exploration Company;

George R. Struck, '34, as Assistant Vice-president—Marketing, Eastman Kodak Company . . . *Harry B. Goodwin, '37,* as Assistant to the Director, Columbus Laboratories, Battelle Memorial Institute . . . *Augustus P. Norton, Jr., '40,* as Manager, Wilmington Plant, Bond Crown Division, Continental Can Company;

Larkin T. Wyers, Jr., '43, as Manager—"Dacron" Manufacturing Production, Textile Fibers Department, E. I. du Pont de Nemours and Company . . . *Max T. Weiss, '47,* as General Manager, Laboratories Division, Aerospace Corporation;

Joseph S. Stoutenburgh, '48, and *Joseph A. Vacca, '55,* respectively, as Senior Systems Engineer, UNIVAC Division, and as Application Engineer, Vickers Incorporated Division, Sperry Rand Corporation . . . *James J. Bennett, '50,* as Vice-president and General Manager, Midwest American, Dental Division, American Hospital Supply Corporation;

John F. Brown, Jr., '50, as Manager, Biological Investigations, General Electric Research Laboratory . . . *Albert L. Zesiger, '51,* as Vice-president, Commonwealth Group of Mutual Funds . . . *Robin Crawshaw, '59,* as Supervisor, Light Vehicle Analysis Section, Controller's Office, Ford Motor Company.

How to Conquer Words

(Concluded from page 29)

self in the reader's place if you get away from the writing for a while and come back fresh.

2. Review the reader's semantic needs and channel capacity. Any change you make in your manuscript must be justified on the grounds that it will help the reader. If he expects you to answer certain questions, be sure the answers are where he'll find them.

3. Divide the revising job into two parts: check the logic and flow of information first, then concentrate on polishing the writing. The first requires a continuous reading at a normal reading rate; the second is a stop-and-go operation.

4. As you read for logic and flow, mark all discrepancies but do not revise until you have finished the entire first reading. You also may mark any errors in composition and mechanics that catch your eye.

5. Reread any spot you marked in the first reading. Back up far enough to place the error in context, then determine whether you need to reword, delete, or add material. Correct accordingly.

6. Whenever errors are bunched, you may be able to revise easier by rewriting the entire subsection or paragraph. Try to salvage the original first, but if you don't gain headway, talk your way through another version.

7. Save the mechanics of format until last. You will have detected most of the flaws, but a methodical check will take only a few seconds per page. Any omissions or inconsistencies can be corrected easily, even when you're tired. Several of the more common sources of mechanical noise were listed earlier. Here are some others:

Captions and numbers not assigned to figures.
Figures not referred to in text.
Figure references appearing too late to be of help.
Appendix material not referred to in text.

8. Finally, reread from beginning to end to see how everything fits together.

An editor is a proverbial "man in the middle." His job is to assist both ends of the communication system —the transmitter and the receiver. In editorial conferences with the writer, the editor acts as a stand-in for the reader, advising how to eliminate pseudo choices that the reader might logically face.

Not all engineering departments have a staff of editors. If yours is one that doesn't, you still can benefit from the comments of anyone who you think has a channel capacity approximating that of your intended receiver.

You can test the coding of your main title and abstract by giving the abstract, without title, to a colleague unfamiliar with the project being reported. Ask him to read the abstract and then write a title of his own. Compare this title with yours. The wording does not have to be exactly the same, but the two should agree in scope and emphasis. If they do not, then either your abstract is faulty or your title does not accurately represent your report.

Another Test for Encoding

You can test the coding of your conclusion by having someone with approximately the same background as your receiver's read your report up to the terminal section. Ask him not to read your conclusions, but to jot down the conclusions he feels are justified by the evidence presented. Then have him read your conclusions and comment on any disagreements.

Any technical description you may have had trouble writing also should be checked. Ask a friend to read the passage and then to recount it in his own words. If he has misinterpreted your meaning, go over the written version with him and correct whatever misled him. Descriptions of the operation or construction of a new device usually cause trouble.

Every time you write a report, whether short or long, informal or formal, you involve yourself in many communication functions. You supply the information for the message, you encode the information into symbols, you transcribe the symbols into written signals, and you select the mechanical channel. Only the last two duties can you delegate to someone else; most of the time you are responsible for them all.

New with 4-wheel disc brakes
'65 CORVETTE

Four great big strong caliper-type disc brakes adorn every new '65 Corvette.

We think that's sort of spectacular for a homegrown American car. Corvette's other news for '65 is sort of spectacular too.

For instance, a new 350-hp 327-cubic-inch V8 you can order. Not just another V8, but a rare engineering feat that blends performance with mild manners. Comes on like a herd of buffalo in crepe-soled shoes. The familiar versions from 300- to 375-hp Ramjet fuel-injected V8 are back, yours for the ordering.

Corvette's interior is upgraded—surprising news, since it was never what you might call dowdy.

And last but not least, you'll find *functional* front fender louvers setting off a passel of styling changes.

But we stubbornly refused to alter Corvette's basic virtues. So it's the same world-beater it always was. Only that much better.

CHEVROLET

Chevrolet Division of General Motors, Detroit, Michigan

New Test of General Relativity

(Concluded from page 16)

results accurate to a few per cent or better if the measurements were continued over a period of several years. It would be different, as it relates to the influence of gravity on light, than the "gravitational redshift" test, and it is potentially far more accurate than the light-ray-bending experiment. Moreover, if the proposed measurements were made with the planet Mercury rather than Venus as a target, they would provide an accurate, independent check on the orbital precession test.

The Shapiro experiment could be conducted most readily at high microwave frequencies (well above 1,000 megacycles per second) because calculations indicate that at lower frequencies the relativistic time delay would be overshadowed by the effect of electrons from the sun's corona. These could also retard the radar waves. A very powerful transmitter and a very sensitive receiver would be required to obtain measurable reflections from a target some 150 million miles away, and since the round-trip travel time of the radar waves would be more than 25 minutes, and the delay to be measured extremely small, very stable and accurate timing techniques and equipment also would be required. In addition, successful performance of the experiment would require the use of a radar antenna producing a very narrow main beam extremely insensitive to signals coming in at angles outside that beam.

Until very recently, such requirements could not be met. But Dr. Shapiro's work suggests that they could be met with the new Haystack Microwave Research Facility developed by the Lincoln Laboratory for the Air Force. Some extension of its initial capabilities would be necessary, but provision for such extensions was made by the designers of the Haystack system, and the necessary time-keeping and time-measuring equipment already is available at the Haystack and adjoining Millstone Hill radar sites.

The Alumni Council's Meeting

DEAN JEROME B. WIESNER of the School of Science addressed the M.I.T. Alumni Council at its 375th meeting on "National Security and the Nuclear Test Ban," the subject of a much discussed article by Dean Wiesner and Herbert F. York in the October, 1964, issue of *Scientific American.*

President Donald F. Carpenter, '22, presided and Chairman D. Reid Weedon, Jr., '41, of the Alumni Fund Board, reported on solicitation progress. Secretary Frederick G. Lehmann, '51, announced that a sixth Alumni Officers' Conference would be held on campus next September 10 and 11, and announced the membership of a newly appointed Alumni Association committee on student-alumni relations. Harry E. Essley, '36, is its chairman.

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(*Concluded from page 21*)

Community TV Economics

NEARLY 1,300 community-antenna television (CATV) systems are operating in the United States, most of them in small communities to which they offer a better video signal and wider variety in programs. Some bring in distant stations by means of single large antennas and others use microwave relays. Their subscribers receive programs via coaxial cable and generally have a selection among offerings of three networks.

What is the effect of CATV competition on nearby television stations? Franklin M. Fisher, Associate Professor of Economics at M.I.T., has investigated this question for the National Association of Broadcasters in a proceeding before the Federal Communications Commission, and in a report submitted last fall he concluded that "the impact is substantial." Under certain circumstances a station can lose up to half of its profits.

Commercial television stations serving these small market areas are much more sensitive to changes in revenue than stations with larger audiences, he says. His statistical computations show that one "TV home" watching in the average prime time is worth roughly $27 a year to the local station. If 1,000 new subscribers join a CATV system in an area that formerly had only one station, the annual revenue of that station drops sharply—especially if the CATV system does not carry the station's programs. On the average this reduction figures out to be at least $14,000 a year, which is equal to more than 50 per cent of the average net profits of typical small stations.

When a CATV system does carry a local station but duplicates certain of its programs, the station loses about two-fifths of its average net profits. In addition, he notes, people who become CATV subscribers are more addicted to television and are likely to have watched the local station more before they joined CATV than people who do not become subscribers.

Professor Fisher's detailed study amassed data on nearly every television station in the United States, but focused on 136 market areas served by one or two commercial stations with CATV competition.

(*Concluded from page 34*)

EFFECTIVE COST CONTROL SYSTEMS, by Winfield I. McNeill, '17 *(Prentice-Hall, Inc., $15).*

Reviewed by F. L. Mettler, *Comptroller, Pullman-Standard Company of Chicago.*

MR. MCNEILL'S book is based on the simple, direct philosophy (emphasized throughout) that the function of accounting is to record the historical facts of the business as they have actually occurred within a reasonable degree of accuracy. Perhaps the outstanding strength and greatest value of this book rests in the lucid discussion of the important factors to be considered in the design of a cost system and the detailed step-by-step procedure to be employed in its installation. In developing his theme the author has called on his many years of practical experience as an accountant and engineer, and his experiences with several successful cost installations.

For those about to launch out in a modern program of cost control this is certainly one of the books which should be read. For others whose cost control programs are not producing the anticipated desirable results it would seem that this book is a must. In concluding his comments on performance measurement, the author makes a statement that is worth repeating: "A good cost control program is one which stirs an organization to the solution of its own problems. . . ." Experienced management people will certainly not quarrel.

From The M.I.T. Press

RECENT BOOKS from The M.I.T. Press not listed or described elsewhere in The Review have included:

The Principles and Applications of Variational Methods, by Martin Becker, '62, of the Knolls Atomic Power Laboratory of the General Electric Company (a research monograph, $6).

Research in Geophysics, edited by Hugh Odishaw of the National Academy of Sciences. Volume 1 deals with the sun, upper atmosphere, and space: Volume 2 with the solid earth and interface phenomena. Each volume is $12.50.

The Technology of Ceramics and Refractories, by P. P. Budnikov, translated from the Russian by *Scripta Technica,* $15.

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The Theater

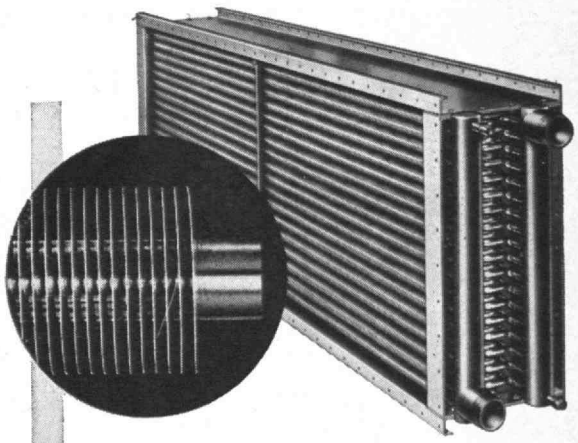
(Concluded from page 28)

of the curve in which they are all involved together. One can think of the center of the circle (though it is no part of the circle itself) as the thing which holds all these parts together, the essence or informing principle, the "point" of the work. Any given element in a narrative or dramatic work will thus serve both as a "story element" *and* as part of the over-all unity of the work.

For example, in a story about a boy falling in love with a girl completely and wonderfully different from any he has ever known, it would nevertheless be a prosaic necessity for boy to meet girl. The writer could choose any one of a number of ways of getting the young man to his ladylove; he will, in fact, choose that way which adds most to the total effect of his story. For example, the young man might have to cross water (cross, in effect, from an old way of life to a new one) and pass a difficult test, as Bassanio does in *The Merchant of Venice*. The young man might very nearly die so as to be, in the Biblical phrase, "born again" to enter this new world, as Sebastian in *Twelfth Night* and Ferdinand in *The Tempest* are. The young man might have to disguise himself (indicating, in a way, he is leaving his former self behind), as Romeo wears a mask, hiding his Montague identity, when he meets Juliet, or as Prince Florizel dresses like a simple country swain to court Perdita in *The Winter's Tale*. In any case, something drastic is required. It would probably not be very effective to have the young man simply trot around next door to find such a transcending love.

The coaction of events in both a realistic cause-and-effect way and a purely poetic way is what Aristotle had in mind when he said that fiction was "a more philosophical and a higher thing than history." History deals with particulars; fiction informs particulars with universal ideas. Oscar Wilde put it more whimsically when he complained, "Life is terribly deficient in form." A chronicler of life, such as a newspaper reporter, has little artistic choice; he is supposed to state the facts as directly as possible. A creative writer, on the other hand, shapes and chooses events to make a unity and coherence that the random happenings of everyday reality just don't have. It is because of this element of artistic choice that the "world" of a play (or novel or story or film) is not simply a copy of the everyday world (in which, for example, our young man achieving a transcendent love probably just met the girl in the college library). To enter the "world" of a work of art, the "theater of the mind" we need to pay attention to the way that world is shaped. We need to recognize that any given element in the story (if it is a good story) functions *both* to tell a coherent tale and to give a unity and "point" to the work as a whole.

This double demand that literature-with-a-story makes on its audience is particularly important in the plays of a verse dramatist like Shakespeare.



HIGH STYLIST

Designing woman? Yes indeed, but in a most admirable sense. As a member of the General Motors design team, she is preparing sketches of a steering wheel for a future GM car. Like her male associates on GM's Styling Staff, she is fully qualified and competent to design consumer products in any field.

General Motors hired its first woman designer more than 20 years ago. Originally color and fabric consultants, the young ladies advanced rapidly to full membership in a group effort which now involves the skills of hundreds of people in GM Styling. In the past two decades, the feminine influence has changed many concepts of automotive design.

Women designers have contributed to the development of interior convenience features, safety items and such innovations as color coordination of interiors with exteriors and particular fabrics to suit women's tastes. Many a man, too, is grateful for these and other feminine contributions.

The role of women in designing beauty, utility and quality into GM products is more important than ever before.

GENERAL MOTORS IS PEOPLE ...

Making Better Things For You

Institute Yesteryears

As recalled by the late H. E. Lobdell, '17

25 Years Ago

WRITING in The Review for March, 1940, Professor *Hoyt C. Hottel, '24,* began as follows:

"Almost every chemist or physicist is, in the large sense, working on the problem of converting the energy of the sun, for the sun is the source of all energy, and almost any problem in chemistry or physics is related in one way or another to the conversion of energy from one form to another. To the Institute, however, the conversion of solar energy has a specialized meaning in the light of the investigation made possible by the gift of $650,000 from *Godfrey L. Cabot, '81* [which has] as its purposes the examination of the possibilities in present direct use of solar energy, and research designed to aid in making such direct use economically feasible.

"All sorts of ways of putting the sun to work have been speculated on both by the ingenious and the ingenuous in the years since men became interested in engineering. In an institution such as Technology, where a harmonious balance is maintained between the point of view of the scientist and that of the engineer, two general ways of approach to this ancient problem are possible.

"The scientist, in thinking about how to convert solar energy into useful power, will look to long-range programs studying fundamental phenomena without regard to immediate application. The engineer would not deserve his title if he overlooked the study of what at the moment appears to be the method most promising of practical results.

"Both points of view are recognized in the Institute work now going on . . ."

50 Years Ago

STONE & WEBSTER'S vouchers covering the first 17 months' expenditure for the construction of the "New Technology," up to February 1, 1915, totaled $1,511,049.16. Of this sum, $340,764.98 (22.5 per cent) was for the foundations, and $781,475.95 (52 per cent) for the superstructures of what would become the present Buildings 1,2,3,4, and 10.

Progress during the month of February toward the completion of these items was as follows:

	Percentage Completed	
	Feb. 1	March 1
Foundations		
Bldgs. 1,2,3,and 4	97	97
Building 10	95	96
Superstructures		
Bldgs. 1,2,3, and 4	57	64
Building 10	14	16

75 Years Ago

"WITH this term," wrote the editor of *The Tech,* "has begun the occupation of the new building on Trinity Place, and students in every department will profit by the increased elbow-room afforded. Some of the rooms are not entirely finished, and there still remains a considerable amount of machinery and testing apparatus to be put in position; but all will be completed in a week or two, and the building will lack nothing except a suitable name. May one that is acceptable to all be soon found! (Later, it was named 'Engineering A.')

"The recitation rooms have a very natural appearance, with their desks and iron-legged chairs of the same familiar old pattern. Just at present the unscratched varnish gives a rather gaudy effect; but that will soon fade . . .

► The editor also noted that: "During the days of vacation visitors to the Rogers Building have seen carpenters at work in the basement, changing the Mechanical Engineering Laboratory into a lunch room, and although the work has been hurried along as rapidly as possible, it will be a few days yet before the rooms will be ready for hungry students. . . . We understand that the Women's Educational and Industrial Union has contracted to furnish the eatables."

100 Years Ago

ON MONDAY, February 20, 1865, President *William Barton Rogers* wrote: "Organized the School! Fifteen students entered. May this not prove a memorable day!"

A half century later, *Eben S. Stevens, '68,* one of President Rogers' original "fifteen," recalled in a letter to the editor of The Review the setting that day "at 16 Summer Street in the Mercantile Library Building where three long narrow rooms had been rented.

"Here assembled fifteen young men as the Class of '68. They were a 'picked-up lot' in that there was no preparatory school for such an institution of learning in those days and little or no examination as the writer recalls. The Faculty consisted of ten gentlemen with Rogers as professor of physics; a most remarkable man, who left his impress upon everyone with whom he came in contact, whether business men who furnished the sinews of war or students who revered him beyond words to express.

"Rogers was genial, attractive, with a pleasant smile upon his strong face never to be forgotten, especially that prominent nose. A scientist of broad culture with such command of exceptional English that the students were forced to obtain Jenkins' *Vest Pocket Lexicon,* by the aid of which we were enabled to elaborate the professor's meanings. Of course, we watched such a mind for some flaw which was never discovered except that he always spelled balance with two *l's.*

"We put the work of the first year into four months under Rogers, Runkle, Storer, and Carlton.

"Returning in the fall, the advent of '69 crowded the Class of '68 over to an abandoned brick dwelling house on the west side of Chauncey Street where were added to the Faculty, Professors Watson and Bocher, the former just returned from Paris with Ph.D. added to his name, a very courteous gentleman of polished manners, but slightly deficient in executive qualities to lead a body of active young men to fully appreciate his many excellencies. Professor Bocher taught us French, inviting us at times to his house where we recited and were received as guests of a gentleman of learning and character."

Class News

'93

Cadwallader Washburn was honored on his 98th birthday, October 31, with a one-man exhibition of his etchings and oils, opening on October 25 and extending through November 15 at the Island Art Center, St. Simons Island, Ga. The artist is also being honored with an exhibition of his work at newly dedicated Brunswick College, for the duration of the college year. He spent his birthday at his home, "Pondside," located at R.F.D. 2, Livermore, Maine. Before moving to Maine the Washburns had lived in Brunswick, Ga. This information is taken from a letter Mrs. Washburn sent to the Alumni Office.

'95

On December 10, 1964, the Alumni Register advised us that their mail sent to **Rittenhouse R. Moore,** Princess Anne Hotel, Virginia Beach, Va., was returned from this address. If you, the reader, can give us any information about him we shall be glad to get it.—**Andrew D. Fuller,** Secretary, 120 Tremont Street, Boston, Mass.

'96

Karl A. Pauly died November 9, 1964, in Schenectady, N. Y. His funeral was held at the Union Presbyterian Church of which he was a member. Born in Springfield, Mass., he lived sixty-five years in Schenectady where he was a member of the Mohawk Club. For three years after graduation he was employed in the Bell Telephone System after which he entered the employ of the General Electric Company where he stayed for thirty-four years; when he retired he was chief engineer in the Industrial Power Department of the company. As a member of the American Institute of Electric and Electronic Engineers, the National Electric Light Association, the American Iron and Steel Institute, the Association of Iron and Steel Electrical Engineers and the American Society of Advanced Science, he wrote and published technical papers and he also obtained many patents. Karl was interested in traveling, geology, astronomy and photography. He wrote and published in 1952, "The Cause of the Great Ice Age;" he also wrote concerning the mechanics of the cause. Since retirement he had spent some winters in California and Florida. He is survived by his brother, Herman, and several nephews and nieces.

Mrs. John A. Rockwell died on November 26, 1964, in **Englewood, Fla.,** where memorial services were held. She is survived by her sister, Mrs. Fred Townsend, who lived near her, and her brother, J. Lester Barnes of Ashland. Mrs. Rockwell was always interested in our class to which Dr. John was so devoted.—**James M. Driscoll,** Secretary, 129 Walnut St., Brookline, Mass.

'97

It appears that the forward movement of our class, exemplified a few years ago by our having four members at one time on the M.I.T. Corporation and by practically leading in per capita contributions to the Alumni fund, has practically expired.

No volunteers have come forth for the suggested class activities such as: a tiddlewink contest with Harvard, '97, a Class Secretary to relieve the friend "acting," or a recipient for the Class Records. Perhaps something more active is desired, such as : a trip in a moon capsule, safe trips across New York city streets, a hearing contest with hearing aids, or a "who has the most arthritis?" contest. Maybe something more useful would be better, such as: How to get a lunch at the New Technology Center in less than two hours, or how to find the obituary list in The Review without reading the whole magazine.—**George Wadleigh,** Acting Secretary, 70 Flower Avenue, Hastings-on-Hudson, N. Y.

'98

Your Class Secretary attended the dinner meeting of the M.I.T. Faculty Club at Cambridge on the evening of last November 16. President Stratton spoke to us on the qualifications of the young men now entering the Institute compared to the qualifications of earlier days. Because of the excellence of our high schools and other preparatory schools, students are prepared for greater demands. Of the present freshmen, 91 per cent come from the top 10 per cent of their senior high or other preparatory schools. It is interesting to note that we now find no students being dropped from the class because of failure to meet the requirements of the curriculum. We of '98 can recall that in those early days, students were dropped occasionally because of such failure. A very few now may drop out for personal reasons but not for lack of ability. The freshman class is limited to 900, of whom now about 5 per cent are women; this number remains approximately constant for the four years, meaning that the undergraduates number approximately 3,600. In addition to these undergraduates, there is an approximately equal number of graduate students, which is surprising to us older grads. About 75 per cent of the freshmen go on to graduate study and there are many graduates who, later, at one time or another, return for graduate work. President Stratton evoked a laugh from the gathering when he said that with the number of years now required for study in order to keep abreast of the new sciences and with the continual lowering of the age for retiring, there is danger of overlapping and one may have to retire before he has finished his studies.

We have received from the Alumni Register a notice of the decease, on October 12, 1964, of **Clarence Goldsmith,** one of our Course II classmates. His home was at Pine Lodge, South Main Street, Andover, Mass. A letter to his family expressing the sympathy of the class, was acknowledged by his son, William G. Goldsmith of 15921 Clifton Boulevard, Lakewood, Ohio. We quote in part from his very interesting and informative letter: "Dad was always proud of his association with M.I.T., and particularly the Class of '98. Apparently, after leaving school, Dad went into hydraulics and was North Andover's (Mass.) first superintendent of water works. He later went to Boston where he worked on the original portion of its high pressure fire service system. Following his service in the Corps of Engineers during World War I as a consultant in fire prevention, he went to work for the National Board of Fire Underwriters, and in 1920 became their assistant chief engineer at Chicago, which is responsible for the territory from the Alleghenies to the Rockies. His only absence from this job was during World War II, at which time he was loaned to the government for the development of fire bombs and fire prevention activity at installations,

Happy Birthday

During February three alumni will be 90 years old; nine will celebrate their 85th birthdays; and ten will have to blow out 80 candles.

February 1875—GEORGE L. MITCHELL, '01, on the 6th; GEORGE R. WADLEIGH, '97, on the 11th; and MARK E. TAYLOR, '98, on the 17th.

February 1880—KATSUZO TSURUTA, '05, on the 5th; ROBERT PALMER, '04, on the 8th; C. LILLIAN GLEASON, '03, on the 10th; DANIEL M. LUEHRS, '06, on the 13th; RUSSELL B. LOWE, '02, on the 14th; WILLIAM T. ALDRICH, '01, on the 16th; WILLIAM P. BENTLEY, '04, on the 22nd; HARRY A. PUTNAM, '01, on the 26th and CHARLES W. KELLOGG, '02, on the 27th.

February 1885—FREDERICK N. PEIRCE, '08, on the 2nd; ALBERT E. GREENE, '07, on the 10th; FREDERICK A. COLE, '08, on the 11th; JOHN C. KINNEAR, '07, on the 14th; WILLIAM NEILSON, '06, and GILBERT S. TOWER, '05, on the 15th; JOHN C. BRADLEY, '07, on the 21st; CHARLES H. CHASE, '06, on the 23rd; PAUL H. MAYER, '09, and FRANK G. SMITH, '11, on the 28th.

many of which were north of the Arctic Circle, and finally for the evaluation of bombing damage in London during the V-2 bombs, and evaluation of Germany following the war.

"Dad was a 50-year or life member of many organizations. He was particularly proud of this in connection with the American Society of Civil Engineers, the American Society of Electrical Engineers, the American Public Health Association and the American Water Works Association. He was active on many committees of the National Fire Protective Association, particularly the electrical and the automatic sprinkler committees. His 50-year memberships included the Masons in the Blue Lodge, Scottish Rite Body and the Mecca Temple of the Shrine, also the Elks and the Odd Fellows. His only club membership was in the Chicago Engineers Club. He held state licenses in over half of the states in our country. He was very proud of his association with our fire departments and was an honorary member of the International Association of Fire Chiefs along with individual memberships in many of their divisions. His leading activity here was his effort to bring the annual Memphis Fire Chief's School into a going educational body. This was a success.". . . We thank William for furnishing us such a complete review of his father's activities. Clarence certainly had a wide experience and his achievements, together with those of so many others of the class who have passed on, reflect credit to '98. . . . These class notes were written in the early part of December. At that time our President, Ed, reported he was "feeling much better and expected to have a final check-up with my doctor on about December 11 when I think every thing then will be all right."—**Frederic A. Jones,** Secretary, 286 Chestnut Hill Avenue, Brighton, Mass. 02135; **Edward S. Chapin,** President, Hotel Eliot, 370 Commonwealth Avenue, Boston, Mass.

'00

We have recently learned that **William C. Clarke** died on June 11, 1963. He graduated from Rhode Island State College in 1898 and then was with us at M.I.T. for two years. He was engaged in transportation and public utilities for 26 years and then in brokerage for 11 years, retiring in 1940. He lived in West Woodstock and later Putnam, Conn. He and his wife attended our reunion in 1951. . . . Mrs. Ingersoll Bowditch died December 8, 1964. She always attended our reunions until the death of **Ingersoll** in 1938. She also attended our 15th Reunion.—**Elbert G. Allen,** Secretary, 11 Richfield Road, West Newton, Mass.

'02

Word has been received from the Alumni Office of the death of **Harold Y. Currey** on November 27, 1964, at his home in St. Petersburg, Fla. There has not been sufficient time to obtain more information but we hope to do so for the next issue of the notes. . . . Here are two addresses: **Joseph W. Ballard,** 687 Bernardston Road, Greenfield, Mass. 01301 and **Arthur L. Collier,** 7 Hillcrest Road, Marblehead, Mass.—**Burton G. Philbrick,** Secretary, 18 Ocean Avenue, Salem, Mass.

'03

Well, classmates, the most prominent news at present seems to be the weather. Our picturesque campus in Cambridge is wrapped in a snowy mantle, with an accompanying tingle to the atmosphere. It inspires memories of our former lawn-campus twixt Rogers and Walker, when under similar circumstances Proxy Tyler's energetic demeanor was always amazed by the sudden influx to our immaculate library in the rear of Rogers Hall, of students-plusiers for diligent reading. Such somber New England conditions will surely arouse our fortunate members who are basking in the glowing heat of California or the sparkling sands of Florida shores. However, these cherished classmates richly deserve every joy and comfort after their long and arduous careers. By the way, this seems an opportune period, a time for reflection on poignant incidents in their lives or careers, to write and lessen your Secretary's dilemma for news in his Comedy Without Errors. Accordingly, I am diverting briefly from '03 news as my obligations are permitted. I have recently discovered an interesting sketch of M.I.T. in "Last of the 1870's," as written by a member of the Class of '81.

"I entered the Institute in the fall of 1877 after my graduation from Waltham High School. Our other Waltham boy, Thomas Howard Barnes, entered at the same time but did not continue beyond the first year. Our Class was perhaps the largest that had entered for some years. It was large enough to occupy nearly, if not all the desks in the first-year drawing room, our headquarters for that year. The first-year students were not divided into the different courses they intended to take; that came the second year. Therefore, we all took the same studies and had the same instructors. For some of the studies the class was divided into two sections: A through L and M through Z. School hours were from 9 A.M. to 1 P.M. and 1:30 P.M. to 4:30 P.M. Some of the members of the class came from various towns near Boston, living at home and commuting every day. I think hardly a railroad entered the city but it brought one or more students. Three of our class, Duff, Lund and Morris, walked from Charlestown all through the four years. There were also students from various parts of the country who lived in boarding houses during the school year. Most of the commuters brought their own lunches. In a sort of second story at one end of the gymnasium was a restaurant, then run by a man named Jones. In the drawing room, where we lived when not in classes, Harry N. Mudge, '74, was the head instructor and Henry K. Burrison, '75, his assistant. The former left in June of 1881, but Burrison remained for many years and was well liked. I know we all thought a great deal of him. Professor William Ripley Nichols, '69, (Billy Rip, as he was usually called behind his back), lectured us on general chemistry and qualitative analysis and was in charge of the first-year laboratories, where he worked two afternoons a week. Nichols had a rather sharp tongue and I think we were a little shy about arousing it. A stupid answer to some question in class would sometimes bring a sarcastic comment.

"Professor William P. Atkinson lectured on various subjects—rhetoric, English, political economy, and I have forgotten what else. His talks were interesting but were apt to be rather disconnected. He always gave an examination at the end of the term but never gave any marks; just passed the whole class. We doubted if he ever read the papers. We had three hours a week in French. Jules Luquiens was the instructor—a Frenchman and a very pleasant person. I think we all liked him. Webster Welles, '73, had us for three hours a week in mathematics, possibly algebra, but anyway geometry and trigonometry, I am sure. He was competent and taught for many years. We had a course of lectures on logic from Professor George H. Howison. I recall nothing about them and am inclined to think that as soon as I had written the last words to my final examination paper I dismissed the subject from my mind. I do not think the course continued after that year. Dr. Samuel Kneeland was the secretary of the Institute and gave us lectures on physiology. We had military drill three hours a week. Lt. Henry W. R. Hubbell, Jr. of the artillery was our professor. We had blue uniforms, blouses and trousers, and caps with flat visors. Twice during the school year we made a trip down the harbor to Fort Warren, marching through the street to the wharf. With the beginning of the second year the class split up into the various courses selected by its members. The civil and mechanical engineers and architects had drawing rooms on the third floor under the professors in charge of those courses. John B. Henck headed the civils, Channing Whitaker, '69, the mechanicals, and William R. Ware, '75, the architects. The miners and chemists were downstairs in the basement with headquarters in the laboratories. I had selected the natural history course and also hung out in the chemical laboratories. Nichols had qualitative analysis the first term, but gradually the boys were moved into the qualitative laboratory under Professor Charles H. Wing, until I was left alone in my glory. I would also have gone but Professor Wing had no room for me just then, and I had to stay where I was until the second term. Professor Robert H. Richards, '68, was in charge of the miners for many years and was very popular.

"Professor Charles R. Cross, '70, lectured on physics the second year and was a very fine lecturer. He knew his subject

thoroughly and explained things in terms easily understood. The lecture hour was from twelve to one, and at the end of the lecture he would ask, 'Are there any questions? If not, that is sufficient,' and away we would go. Occasionally he would keep right on to one o'clock and then it was, 'Arethereanyquestionsifnot thatissufficient,' all in one breath. There were never any questions then. I think Professor William H. Niles lectured to us on physical geography the second term of that year, but I am not sure. The third year he and William O. Crosby, '76, Assistant Professor, gave us geology and I was rather under their charge during the fourth year. Professor Charles P. Otis taught us German the second and third years. Although I used German some in my studies the fourth year, I was anything but proficient in the language.

"Professor John M. Ordway taught various subjects, mostly relating to chemistry. There was a saying at the Institute that when a teacher was needed for some subject and no one else was available, the job was wished on Ordway. He was certainly a widely-informed man. It seemed to me that there was nothing you could ask him to which he could not give you an answer. The instructors remained the same during the rest of our years, though of course their subjects changed as time went on. I can say nothing about the work of the three groups upstairs. The chemists and miners lived in the chemical laboratory and I with them, so of course I knew them best. The third year we had physical laboratory and there Professor Cross had a fine assistant, Silas W. Holman, '76. There were two men in charge of the department of mathematics, Professor George A. Osborne was the head and Professor Gaetano Lanza was his assistant. The latter remained at M.I.T. for many years. The fourth year all the candidates for degrees worked at their theses. Our class was the last to be graduated under the presidency of William B. Rogers. He had already resigned, and Francis A. Walker was to succeed him. The next year, 1882, Rogers fell dead on the platform as he was addressing the graduating class: a fitting end for such a wonderful man.

"The principal building at the Institute, in my time, was, of course, the Rogers Building, though it did not receive that name until many years afterward. Near the Clarendon Street side was a one-story building, the women's laboratory. Another one-story building housed the School of Mechanical Arts. Over near Clarendon Street was the gymnasium, where we had our military drill. Now of the Class of '81 only five of those who took degrees survive: Came, Collins, Mower, Norris and Warren."

Fred B. Crosby, VI (Col.) writes: "Your note of June 3 received and appreciated. It is with real regret that I could not be one of the fortunate group of '03 gathered on June 15. I expected to be in New England by July but could not make it for the reunion. The circle of those whom I knew best has grown small indeed but with every good wish for those still with us and with kind personal regards, Sincerely, Fred." . . . **Adolph E. Place,** I, writes, "I certainly would like to come but I am now in my 88th year, retired, living with my family and in my home. I am physically not in shape for the long trip back East. I wish all of you however a most pleasant reunion, good health and many more enjoyable years. Sincerely, Adolph." . . . New addresses: Dr. **Alice F. Blood,** V, New Hampshire Hospital, Medical and Surgical Building, Concord, N.H.; **Daniel C. Picard,** V, Route 1, Box 394, Stuart, Fla. . . . **Clifton A. Towle,** VII, of 315 Orchard Drive, Mount Lebanon, Pa., passed away January 13, 1963. . . . **Frank S. Bradley,** III, of 2 Woodland Road, Dover, N.H. passed away September 15, 1964. . . . **Robert B. Peters,** II, of 376 Pearl Street, Laguna Beach, Fla., passed away July 12, 1964.—**John J. A. Nolan,** Secretary, 13 Linden Avenue, Somerville, Mass.; **Augustus H. Eustis,** Treasurer, 13 State Street, Boston, Mass.

'04

Your class secretary was released from the Massachusetts General Hospital on November 20 after a three weeks' session. He woke up one morning and discovered that he was bleeding internally which necessitated an emergency visit to the hospital. For 18 days he was fed intravenously without a mouthful of water or solid food and after two complete X-rays and several electrocardiograms with innumerable blood tests and other tests, the source of the bleeding was discovered to be a hyatus hernia at the base of the esophagus. A diet of baby food has been prescribed and a good recovery is being made but once is enough. Our versatile treasurer generously agreed to write the January notes and other friends have been very helpful and kind. . . . There is only one other item of class news. **Blaine H. Miller,** I, died July 22 at Indianapolis.—**Carle R. Hayward,** Secretary, 120 Beacon Street, Boston, Mass.; **Eugene H. Russell, Jr.,** Treasurer, 82 Stevens Road, Needham, Mass.

'05

You did not find any '05 notes in the January issue. The answer? It's just as Theodore Taft wrote in the November issue: "I have run out of class news, so if there is no 1901 news in the next issue, it is because I have nothing left to write." So, it is up to you. Fortunately the Christmas spirit has caused some '05 men to give so we're off and running. . . . I wish that space permitted me to quote in full some of the Christmas letters I have just received. For instance, **Hal Robbins,** I, has sent me a three-page, single-spaced typed letter, which I am sure most of you would like to read. It is very hard to apply the blue pencil but I am quoting several interesting items: "This has been a reasonably successful and satisfactory

Deceased

RITTENHOUSE R. MOORE, '95
KARL A. PAULY, '96, November 9*
FRED D. FITCH, '97, September 12
CLARENCE GOLDSMITH, '98. October 12*
LAWRENCE ADDICKS, '99*
ARTHUUR B. FOOTE, '99, July 1
WILLIAM C. CLARKE, '00, June 11*
NORMAN A. DUBOIS, '01, October 16
HAROLD Y. CURREY, '02, November 27*
ROBERT R. JORDAN, '03, November 24
HAROLD OSBORN, '03, August 29
OTTO STEINMAGER, '03
EUGENE W. MASON, '04, August 28
BLAINE H. MILLER, '04, July 22*
ROBERT K. CLARK, '05, November 23*
KATSUGO TARUTA, '05
JANE BOIT PATTEN, '06, December 4*
S. MARTIN UDALE, '06, June 15*
ISAAC I. YATES, '06, August 29*
CHARLES R. BRAGDON, '07, November 18*
ROY W. LINDSAY, '07, November 12*
FRANK W. POLAND, '07, March 26*
ALDRICH BLAKE, '09, September 22
STANLEY H. PAGE, '09 October 5
IRA W. WOLFNER, '09, November 14
ANDREW L. FABENS, '10*
THEODORE B. WHITTEMORE, '10, May 22*
FREDERICK C. HARRINGTON, '11, Dec. 13
GEORGE L. CURTIS, '12, October 7*
RALPH N. DOBLE, '12*
ALBERT G. GALE, '12, November*
ROBERT H. WOODS, JR., '12*
EDWARD CAMERON, '13, November 28*
CHAUNCEY A. CRAWFORD, '13, June 23*
SAMUEL S. CROCKER, '13, November 28*
FALTON Q. C. GARDNER, '13, August 13*
HUGH P. LECLAIR, '13, April 20*
CHARLES H. MADDOX, '13, June 23*
RALPH H. PERRY, '14, November 5
AUBREY D. BIEDELMAN, '15, November 6*
NASSIME S. KLINK, '15, June 19*
J. WORTHEN PROCTOR, '17, December 7
GEORGE L. ROY, '17, November 4
JOSEPH B. WIRT, '17
CARL B. HARPER, '18, December 7
FRANK W. LAWTON, '20, November 1
FRANCIS L. MEAD, '20, November 20*
HENRY C. ALLEN, '21, Dec. 12, 1963*
JOHN E. BUCKLEY, '21, December 9
PHILIP EXTON GUCKES, '21, November 8*
GEORGE M. HERRINGSHAW, '21, Jan. 6, 1964*
T. DODSON STAMPS, '21, April 12
GEORGE DEVLIN, '22
VALENTINE GAHNKIN, '22*
WILLARD A. KITTS, 3d, '22, November 21*
WALTER E. LENNON, '22*
ARNOLD W. MILLIKEN, '22, November 26*
N. CONANT WEBB, '22, September
GEORGE W. FURBUSH, '25, November 1*
THOMAS H. JOYCE, '25
GEORGE HANNAUUER, JR., '26, May 1*
ERNEST W. CARR, '27, September 4
DAVID R. DONOVAN, '28, February*
CHARLES F. FORD, '29, December 3*
ADAM K. STRECKEN, JR., '29
RUSSELL M. SWAIN, '29, Dec. 12, 1963*
GEORGE BARKAN, '30, December
GEORGE A. CATANZANO, '31, Sept. 8*
FRED C. YOHN, JR., '31, March 11
WILLIAM R. FRANKLIN, '42, June 28
THOMAS HADLEY, JR., '47, October 30
F. PATTERSON SPENCER, '48, April 3*
RICHARD DAVIDSON, '49, September 12*
WILLIAM J. SADLOWSKI, '53, March 27
PETER C. BULKLEY, '55, November 23
JOHN REDMOND, '59, August*
CHARLES THORNTON, '59, September 13*

* Further information in Class News

year with the single important exception that no way has been found to repair the damage inflicted upon my ears by the explosion to which they were exposed last year, and I remain permanently and hopelessly excluded from the beautiful world of music which I enjoyed so much. Individual conversations can be carried on without too much difficulty, under favorable circumstances. Further experimentation with hearing aids has confirmed previous conclusions that they are of no use, except perhaps to a very limited extent in certain particular situations. In June I spent three weeks in LaJolla visiting my niece and her family and undergoing a very thorough physical examination and check-up under the supervision of her doctor-husband. Except for the ears, everything was normal and satisfactory for my age and history. In particular, there was no evidence of any recurrence of the cancer for which I was operated on October 31, 1960. In September I joined an American Heritage tour sponsored by the American Association of Retired Persons, starting from and terminating in New York, and including two days at the World's Fair. There were 38 persons in the party, all women except three couples and myself. We traveled by chartered bus with a competent tour director. Although Dr. Bordley gave me the most thorough examination I have had since the explosion, including X-rays, I was unable to make him realize that an adequate diagnosis cannot be made from the audiograms taken before and after, because the sound distortion which is my problem is not caused by hearing low tones better than high ones. It is due to the fact that my damaged hearing mechanism actually changes the apparent frequency of the sounds which enter it or reports them incorrectly to the brain. I am going to do some research myself along this line by getting an inexpensive piano and undertaking to retune it to fit my ears which I believe I can do. Meantime my stereo-radio-phonograph stands silently gathering dust. I do get some benefit, however, from my color TV and can understand most of the newscasts and enough of some of the dramatic programs to follow them. I continue to be well-satisfied with my living arrangements at Orangewood and have no complaints of any kind, and hear none from other members. The food is excellent, as is the management, and the atmosphere cheerful and friendly. We now have a total of 216 members, including 23 couples, 137 single women and 13 single men." Hal is such a wonderful correspondent, that I'm sure he might put you on his list. His address is Orangewood, Apartment 202-8, 7550 North Sixteenth Street, Phoenix, Ariz. His reference to the American Heritage tour is interesting because Ruth and I are members of A.A.R.P. and have considered one of their tours. His description of the tour is a remarkably well-written and interesting story—35 lines long. A.A.R.P. should use it in their advertising. Hal's reference to Dr. Bordley means that he had appointments with Dr. John E. Bordley, Otolarynologist-in-Charge at John Hopkins Hospital.

I am going to quote also from a letter from my other good correspondent, **Willard E. Simpson.** It is a four-page letter just as interesting as Hal's. "I am gradually getting back on my feet and feeling all right, except always a little wobbly, but that is getting better too. I think this is on account of not being able to see out of my left eye. I have been to my doctor and he says that I am physically fit again, except for the eye. I can get about now. In fact, I was out on a very fine turkey and deer hunt the 15th and 16th of this month on which I got a very nice wild gobbler and could have shot a deer, but I was a little choosy. He was too small, he only had six points, and I wanted at least eight points on the horns. I may get another chance on his ranch again. You know the eye that is affected is my left eye, and fortunately that is the eye that I usually shut or leave open and don't use in shooting. Hence, there was no trouble in spotting the deer in my scope and putting him in my sights and also it wasn't any handicap against my shooting a turkey. So, you see I have tried it out. Of course shooting a deer, even standing, required a very careful drawing of a bead on the deer. Well, I can do that too. So, I am not suffering from my loss of eyesight except the wobbliness, and also the constant fear of something happening in that left eye that will cause its removal still. The doctor won't promise me anything, but he thinks that I am getting along all right and the eye is improving, even my good eye. I guess that all 1905 men remember old **C. D. Klahr** and how he suddenly bobbed up behind Charlie Cross's desk very much to the disgust and consternation of Charlie Cross and ambled right up the aisle to his seat and sat down. You know the rest. I think Klahr ought to be at the next reunion to tell us about what was on his mind when all of that happened. Well, he was sure ordered out quick. Later on, my class in senior year structures had somewhat of a different angle of coming to class than that. Professor Swain in our structures class had told us that we were supposed to wait in a room for five minutes after the hour, and if the professor didn't show up we could leave. Well, one day he didn't show up for thirty minutes after the hour. I remember him opening the door very softly and peeking through the crack in it, and we were all there waiting for him. When he got inside, all he could say was, "Gentlemen, I am surprised and honored." That didn't induce him to let up on us when he did start the class because I remember he bore down just as hard as ever on everybody." Sorry to have to condense, Willard, but I enjoyed it a lot. Incidentally much of his letter was used in trying to persuade Ruth and me to enjoy his hospitality next spring, as we did last year. It's a pretty good bet that the May and June notes will be written in Boerne, Texas.

Over the years I have tried to keep a record of the birthdays of my classmates. I have missed a few, but I believe I am correct in saying that on February 15, 1965, **Gilbert S. Tower,** XIII, is the last man to enter the octogenarian class. Congratulations, Gib, and lucky Elizabeth to have had him so long. . . . We have already had one enthusiastic enrollment for our 60th Reunion, **Jack** and Susan **Flynn** from Buenos Aires. With his letter comes notice of a new business address. I'll give it all to you because I don't know enough Spanish to know what it means—Paseo Colon 221-Of. 14, President I.P.S.A.M.-S.A. Porcelana Americana, S.A. Evidently Jack is still in business, but he has had serious trouble with his eyes. . . . **Harry Kendall,** VI, writes from Portland, Ore.: "I doubt if we shall get away back to Boston for the 60th Reunion although I'd like to. We have the annual convention of building owners and managers at Vancouver, B. C. the latter part of June, 1965, and we'll drive up for that and do a bit of loafiing going or coming. My wife and I and our two boys and their families are all well and busy. Three grandsons in college, one granddaughter working in New York City, and two granddaughters in prep school. I did not like the election. I was glad to have a choice, not an echo, but I didn't care for either. I guess we shall have more welfare state and inflation and shall just have to make the best of it. Nobody shoots Santa Claus!"

I was sorry not to have been able to attend **Andy Fisher's** memorial service in Milford, N. H., on October 10. Doc Lewis attended. . . . We are informed through the Alumni Office that **Robert K. Clark's** (II) son telephoned that Bob died on November 23, 1964, presumably at his home in Fish Creek, Wis. Since **Phil Hinkley's** death Bob had not been making his more or less regular trips east.—**Fred W. Goldthwait,** Secretary, Box 32, Center Sandwich, N. H.; **Gilbert S. Tower,** Assistant Secretary, 35 No. Main Street, Cohasset, Mass.

'06

Those cards with red candles and holly and decorated trees and snowy landscapes are arriving—a few from classmates but unfortunately these notes must be filed by December 15 so you may find some messages quoted next month. . . . **Frances Fuller** sent us a nice letter on her card. She sold the house in Bethlehem a year ago and moved to an apartment at 914 West Broad St. She says: "It is such a relief to let someone else worry about outside chores and inside up-keep!" She may send me the movies and stills taken at several of our reunions, and concludes: "My very best to you and '06." . . . Early in December I had a talk by phone with Bertha and **Sherm Chase,** XI. He has been the representative of the Albany Club on the Alumni Council for many years. That club hasn't been active, however, and it was recently de-activated, when Sherm was switched to the Knoxville Club. . . . On the same day **Carroll Farwell,** I, phoned me from his home in Sharon to get an address and ask about Jim. As reported last June, Carroll's wife Alice passed on in April. They had attended all our reunions since '31 and Carroll allows that he has been "fortunate in that one or the other of two sisters-in-law run the house for me so it has not been necessary

for me to give up my home. I go to Boston only occasionally but still interest myself in affairs of Fay, Spofford and Thorndike who are celebrating a 50th anniversary this year. If you are in this vicinity, please drop in."

We had expected to take a mum and visit Jim along in November but telephoned before doing so and learned that his sister Mary was in the Winchester hospital for rest, change and check. She was home after a few days and talked with Marion. In our talk with his day nurse we were advised not to bring or send plants or flowers and not to visit him as it is quite upseting for him and the nurse, and explained why. He does like to get mail—postcards and notes. . . . Early in December came a long letter from **Burton Kendall,** VIII, that brought sad news. On November 13 while returning from a call they had made in Princeton, N.J., their car was struck by a truck and Marie was so seriously injured that Burton believes she was unconscious while being taken to the hospital where an hour of the doctors' efforts were of no avail. They have spent several past winters at Lake Wales but Burton said he cannot plan much ahead as yet. . . . Some of the long-time Florida regulars are gone—**Si Young** and **Abe Sherman**—but other regulars are probably there—the **Allyn Taylors** for example. . . . **George Guernsey,** I, landed at the Orange Court Motel in Orlando along in November. He said he was having fun at Lawn Bowling, on a hard surface, but didn't mention golf! George had stopped off in Wilmington, Del., to visit his daughter Mary, who then drove him down to Orlando. In an earlier letter from Wilmington he had sent me prints of five pictures taken at the All Technology Reunion at Nantasket in 1916, with 97 of our class in the Parade and putting on the class "stunt." It will soon be fifty years since the "Tech on Boylston Street" moved to Cambridge!

Here is more information about **Claude McGinnis** whose death on October 11, 1964, was reported in the January notes. The letter there referred to brought a prompt and very helpful reply from the wife of his younger son, Mrs. Arthur T., who lives nearby. The older son, Robert E., lives in Chappaqua, N.Y. Mrs. McGinnis sent copies of obituary clippings from Philadelphia papers and a news release by Temple University. These have been returned to her with a letter in which I extended our thanks and sincere sympathy on behalf of the class. Much of the information contained in the news release was the same as that already reported, but it also listed his memberships: the American Association for the Advancement of Science; the Accoustical Society of America; the American Association of Physics Teachers and of University Professors; the Philadelphia Science Club, and Sigma Xi. What my available sources did not show me was that he had taught physics at that Shortridge high school where he had graduated, from 1900 to 1902, so Claude was a teacher even before he came to Tech, and was forever after. He had authored numerous articles on experimental research and was a specialist in the field of the acoustics of musical instruments. The older son, Robert, takes after his father, being professor of clarinet at U. of Indiana, and former first clarinetist of the Philadelphia Orchestra and the New York Philharmonic.

There are three deaths to report, one only recently reaching the Alumni Office from the Navy Directory. Capt. **Isaac Irving Yates,** XIIIA, S.M., died August 28, 1957, probably in Coronado, Calif., where he had been living in retirement. He entered the navy in 1897 and after graduating from the Naval Academy was one of that group who joined us in junior year, when his home address was Schenectady. In 1915 he was listed as naval constructor at the Norfolk Yard and as a commander in the Construction Corps there during W.W. I he was involved in repairing and altering vessels of the fleet, installing guns on merchant ships, camouflaging skips and fitting paravanes, repairing transport and building destroyers and submarine chasers. His subsequent service was similar. By 1925, with rank of captain in the Construction Corps, he was in Washington in the Navy Department; in 1930 he was at the New York Yard, then he went back to Washington and later to Mare Island in California. Around 1948 he was the Navy Department inspector at the submarine plant of Electric Boats at Groton. He retired early in the fifties, I believe, to Coronado.

A more recent death was that of **Stanley Martin Udale,** II, on June 15, 1964, in Detroit. He was born January 25, 1885, in Lincoln, England; prepared at St. Paul's School, London, then obtained his B.Sc. at Central Technical College of London University. As a demonstrator (researcher) there in 1904-1905 he made a stress analysis of a cross section for the Aswan Dam, and invented the carburetor used on British war planes. He entered Tech as a graduate student in our senior year and roomed at Tech Chambers. Stanley was a member of the M. E. Society, the Civic Club, the British Empire Association and ran cross country. His thesis was on "Determination of Poisson's Ratio." My available sources do not cover the next six or seven years but it was probably during this period that he obtained his LI. B. at Detroit College of Law, becoming a member of the bar and a practicing patent attorney. Between 1911 and 1913 he was with three of the automobile companies, then with Holley Carburetor Company until he retired. He was author of numerous papers and a contributor to Horseless Age between 1909 and 1913, and was also awarded some 70 U.S. patents. He was a member of Detroit Engineering Society, the Detroit and American Bar Association, and a life member of the Michigan Patent Law Association. He married Lahvesia Packwood, '09, who died April 19, 1964, and they had one child, Miss Blair Udale, with whom they lived for awhile in Modesto, Calif. It was in 1957-1958 that Stanley wrote me about the numerous letters he had been sending around to Go Slow on A-H Ban, and Disengage First then Disarm. His last letter, in December 1958, was to tell me they were back in Detroit at the old address and that he was "keeping busy acting as unpaid reader for Senator Johnson, etc., etc., etc." Wonder what Stanley Udale has been doing for LBJ since 1958!

One of our coeds, Miss **Jane Bolt Patten,** VII, S.B., who was born June 8, 1869, passed away December 4, 1964. She was a member of Cleofan and her thesis was on "The Influence of Neutral Salts upon the Rate of Enzyme Action." After graduating she was for 14 years or more an instructor in biology at Simmons, the girls college in Boston. By or before 1920, while still teaching, she acquired several acres in South Natick, called it Elm Farm and probably soon after, gave up teaching. Through the years Marion and I have driven by that farm on Eliot Street; it is a dairy farm, I believe. In March, 1964, a change of address came through the Alumni Office, though she was still in South Natick. Miss Patten was a loyal member of our class and paid dues for several years—**Edward B. Rowe,** Secretary-Treasurer, 11 Cushing Road, Wellesley Hills, Mass. 02181

'07

I have had many requests for information about our proposed interim reunion at Oyster Harbor this coming June. Early in January I will canvass the Class to see what the majority of the members wish to do. There seems to be some indication that a different meeting place might induce more members to attend.

From the birthday letters that I have sent out, I have had several replies. **Seymour J. Egan,** XIII, wrote to me from Jersey City, where he was visiting with his daughter. He plans to get back to Wakefield before Christmas, as he has six grandchildren there and two more in nearby Marblehead. . . . **Tucky Noyes, I,** wrote, reminiscing about the 1907 track team and some of the events at Tech field in Brookline in our sophomore year. . . . **William S. Wilson,** V, noted that he had retired as research director of Monsanto Chemical Company 15 years ago. He lives alone in the Chestnut Hill area of Boston, as he has no known relatives. His only extravagance is the purchase of a new Cadillac each year. . . . **Bob Rand,** II, read my request for information on great-grandchildren. He has two great-granddaughters. In a later Review, I will give the Class an up-to-date report on this subject. . . . In the November issue of The Review, under "Happy Birthdays," the name of Roland H. Whitcomb, '07 was given. This was a printing error; it should have been **Roland H. Willcomb,** III, who was well known among the men in Mining Engineering. He did his thesis with **A. E. Wiggin**. . . . I have received the documents from Canada sent at the request of **James Barker,** I, and pertaining to the establishment of the **C. D. Howe** Memorial Foundation which is to perpetuate the memory of our classmate. They will be kept in our archives and eventually become a part of the records of the Alumni Association. . . . Please make the following correction on your address list of '07 men: **Frank S. MacGregor,** 2401

Pennsylvania Avenue, Wilmington 5, Del.

Frank Webber Poland, II, passed away on March 26, 1964. He was carried as a "non-associate" in our class files. Upon receiving notice of his decease from the Alumni Register, I wrote a belated letter of sympathy to his family at his home in Marion, Mass., and received an interesting reply from Mrs. Poland. After Frank left M.I.T., he took a six-year course with the General Electric Company at Lynn. He married in 1913. In 1914, he became plant engineer for the Hood Rubber Company in Watertown, where he had charge of all new construction during World War I. During World War II, he worked for the U. S. Rubber Company at Detroit, Mich. Then for many years he was working in Labrador for Metcalf and Eddy and Fay, Spofford and Thorndike. In 1957 he returned to the States but, due to ill health, was forced to retire. There were two sons in the family. Frank W. Poland, Jr., attended Amherst and Harvard. He was a lieutenant colonel in the Marines during World War II. Robert Poland was educated at Citadel Military College. He was captain in the Air Transport Command and lost his life as a pilot during World War II. Frank had willed his body to Harvard Research so that, upon his death, there was no interment.

Frank MacGregor wrote me on November 23, telling of the death of **Carl Braggdon,** X, and in a few days I received a letter from Carl's daughter confirming his decease. I wrote at once to the family a letter of sympathy, and they sent to me an obituary notice for our files. Carl had retired in 1953 as head of the special services department research laboratory of Inter Chemical Corporation of New York after being with that concern and its predecessors for 38 years. He was a resident of Larchmont, N.Y. Carl came to us from Northwestern University, where he received a B.A. degree in 1905 and then received a B.S. degree from M.I.T. in 1907. He will be remembered for his publications; the best known was, "Metal Decorating from Start to Finish." Surviving are his wife and three daughters. . . . The Alumni Register sent me a notice of the death of **Roy W. Lindsay,** X, on November 12, 1964, in his 79th year, at his home in Buffalo, N.Y. I wrote to the family on December 4 but have received no details. These I will report in a later issue of The Review. We missed Roy at our 55th Reunion in June of 1962. Previous to this, he had attended six reunions in succession and had taken charge of the golf tournaments, purchasing and awarding the prizes. Roy was an outstanding figure in the field of paint manufacture. He was an official of Pratt and Lambert and had published several important papers on paints.

It seems as though each issue of these Review notes contains the sad news of the decease of one or more members of the Class of 1907. As your secretary, I must record all of these, as well as the activities of our living members. "The days of our years are three score years and ten and if by reason of strength they become four score years, yet is there strength, labor and sorrow for we are soon cut off and fly away." Very, very few of the Class are today under four score years.—**Philip B. Walker,** Secretary and Treasurer, 18 Summit Street, Whitinsville, Mass.; **Gardner S. Gould,** Assistant Secretary, 409 Highland Street, Newtonville, Mass.

'10

I have to report the deaths of **Theodore B. Whittemore** and **Andrew L. Fabens. Alfred Hague** sent me the following clipping: "Colonel Andrew Fabens, 77, of 406 North Ocean Boulevard, Delray Beach, died at Bethesda Memorial Hospital following an extended illness. He was a retired colonel of the U.S. Army Corps of Engineers, having served through both world wars to retire in 1945. Colonel Fabens moved to Delray Beach from Wooster, Ohio. He was a commissioner of the Southeastern Palm Beach County Hospital District."

The month of November was a very busy one for your secretary. Possibly it should not be called "busy" but rather a month of pleasure. On November 6 I started for Nassau in order to use the ocean air as a tranquilizer. I arrived back on November 12 very much rested but immediately started for Rochester, N.Y., to attend **Harold** and Jes **Akerley**'s 50th wedding anniversary. **Fred Dewey** and his wife were also present; Fred was best man at Harold and Jes's wedding. It was a most delightful affair and I enjoyed it very much, indeed. Fred and his wife celebrated their 50th wedding anniversary in New York City on November 24. Both couples are to be heartily congratulated. . . . **Leroy Briggs** has fully recovered from his very severe operation and from his long stay in the hospital. . . . I heard from **Arthur Curtis** a few weeks ago. He is still active in business and goes to his office four or five days a week. . . . It is hoped that by the time you read this you will have received full information on the 55th Reunion we are to celebrate this coming June.—**Herbert S. Cleverdon,** Secretary, 120 Tremont Street, Boston, Mass.

'11

Thanks to Sally Denison we have a **George Kenney** news item from Ed Sullivan's "Little Old New York" column in the Worcester, Mass., Gazette: "After reading Harry S Truman's startling TV series accusation that the late General Douglas MacArthur had acted rudely to General Jonathan Wainwright after the gaunt hero of Corregidor was released by the Japs, this writer phoned an old friend in New York City, General George Kenney, who commanded in the Pacific the Allied Air Force of 5,000 United States, Australian, Dutch, New Zealand men and planes. 'I can only trust that former President Truman was misinformed,' said General Kenney, 'because otherwise he made a false and outrageous statement. My planes went to Mukden and picked up Wainwright, freed from the Jap prison camp with British General Percival, captured when the Japs took Singapore. My pilots flew them to Sugi Airport, Yokohama, and then took them to the new Grand Hotel, where General MacArthur threw his arms around Wainwright in an outburst of emotion I've never forgotten.' "—**John A. Herlihy, Treasurer and** Acting Secretary, 588 Riverside Avenue, Medford, Mass. 02155

'12

A letter received from Mrs. **Chester L. Dows** enclosed a newspaper clipping of interest. Mr. and Mrs. Chester Dows, 1855 Charles Road East, Cleveland, celebrated their 50th wedding anniversary on October 10 with more than 130 relatives and friends present. After graduating from the Institute, Mr. Dows served for 40 years as executive electrical engineer with General Electric at Nela Park, retiring in 1952. Celebrating with the Dows were two children and 9 grandchildren. . . . **Albert G. Gale** of Depot Road, Boxford, Mass., passed away in November after a short illness. Bert retired from the General Electric Company some years ago after being with them for 30 years in the Turbine Engineering Department in Fitchburg. . . . **George L. Curtis,** Course VI, of 77 Walden Street, Newtonville, Mass., passed away. Sorry I have no word of his recent activities. . . . Word has just been received of the death of **Robert H. Woods, Jr.,** who passed away some years ago. After leaving M.I.T. he was associated with the Southern Power Company of Charlotte, N.C., later becoming vice-president of the Southern Public Utilities Company which later merged with the Duke Power Company of which he was an executive until his death. . . . **Ralph N. Doble** passed away at his home at Brewster, Mass. After leaving M.I.T. he became associated with his father in the family business, the Pneumatic Scale Company of Quincy, Mass. He was of an inventive turn of mind and is credited with creating the first package machine for tea bags. He served in both wars, with the Army Corps of Engineers in World War I and as a Navy commander at the Hingham Shipyard during World War II.

If you have not yet contributed to the M.I.T. Alumni Fund I hope you will take heed of **Albion Davis'** last letter and do so. The Class of 1912 had only 39 per cent of their living members as contributors last year. This is very low and I sincerely hope we can do better. Even a small contribution will be greatly received. Why not send a check to the M.I.T. Alumni Fund, Cambridge 39, immediately?—**Frederick J. Shepard, Jr.,** Secretary, 31 Chestnut Street, Boston 9, Mass.; **John Noyes,** Assistant Secretary, 3326 Shorecrest Drive, Dallas 36, Texas.

'13

This is the year that you asked for an interim reunion. We have communicated with the Oyster Harbors Club. Don

Church has resigned as manager and Richard C. Knowlton (formerly Don's assistant) is now the manager. Dick has informed us that the Class of 1930, M.I.T., has made reservations, estimated at 100 plus, so that we must hold our reunion at some other locale on the Cape. This we shall do and we shall keep you posted. . . . It is always a pleasure to hear from **Prescott Kelly** and we quote: "No reminder as yet of class dues, but here is a check. We think we would prefer Oyster Harbors, but not knowing the alternative and perhaps not being able to attend perhaps I shouldn't vote. I am planning to attend my namesake's and grandson's graduation from Williams, and the time may conflict. Otherwise, we hope to be there. Warmest regards to your wife and yourself, from Marguerite and Prescott." We are looking forward to seeing you two dear folks in June. . . . It is with a very sorrowful feeling that we must report the death of **Ed Cameron,** who has been incapacitated for several years. During most of the years since we left the Institute, Ed has been a very loyal and constant worker for the Class of 1913, until he was stricken about five years ago. Cameron passed away at a Lexington home on November 28, 1964. Ed was associated for many years with Jackson and Moreland of Boston as head of the technical publication division. He was a past president of the New England Section of the American Society of Civil Engineers, as well as a member of the M.I.T. Alumni Council, Newcomen Society and the Boston Society of Civil Engineers. Cameron was the author of several reviews and publications on civil engineering and technology as well as several historical treatises, particularly on the Slater Family, founders of the textile industry in America. He leaves three daughters: Elizabeth Cameron of Southboro, Mass., Mrs. Robert H. Semple of Needham, and Mrs. Elliott K. Blaisdell of Winchester; and six grandchildren. We shall miss dear old Ed. . . . It is noted that **Edgar W. Taft** has changed his address from Branford, Conn., to 2612 Torlugas Lane, Fort Lauderdale, Fla. We hope, Edgar, that you will probably return to the north by reunion-time. . . . Again, we are saddened to observe in the Boston Herald and in a clipping from Warren Clancy that another dear classmate, **Samuel Sturgis Crocker,** passed away on November 28, 1964, at the Beverly Hospital, Beverly, Mass. Although Sam originally was a native of Newton, he had lived in Manchester, Mass., for 40 years. He was always a loyal and strong supporter of 1913, although we saw him very seldom at the Institute affairs. Sam was devoted to his chosen career as a designer and naval architect. He assisted in designing the pontoons for the NC4, ocean crossing seaplane in 1919, besides more than 300 vessels, including yachts, large commercial ships, submarines, submarine chasers, and also minesweepers during both world wars. Further, Crocker was a former associate member of the Woods Hole Oceanographic Institute and resident architect at the Simms Boat Yard in Dorchester and the Lawley Boat Yard in Boston. He was also one of the organizers of the Manchester Harbor Yacht Club. Sam is survived by his wife, Ethel M., a daughter, Miss Anna M., a son, Samuel Sturgis, Jr., all of Manchester; another son, George P., of Middlebury, Vt., and a sister, Mrs. Margaret E. Knott of Barnstable. Yes, Sam Crocker lived a very full and noteworthy life. The Class of 1913 offers its most heartfelt sympathy to his fine family.

The issuance of the 1964-1965 dues bills brought forth several constructive comments, but on the other hand, most classmates were silent. Also, as usual, together with the frequent notices from the Alumni Office, there was too much sad news. . . . It is our sad duty to inform you of the passing of several of our dear friends to our Master. On August 30, 1963, General **Fulton Q. C. Gardner** of Summerville, S.C., passed away. . . . Capt. **Hugh P. LeClair,** Holly Hill, Friendship, Md., died on April 20, 1964. . . . On June 23, 1964, **Chauncey A. Crawford** of 27 Dogwood Drive, Summit, N.J., passed on. . . . Again, we are in receipt of the sad news that Captain **Charles H. Maddox** departed this life on September 22, 1964, at 2446 Belmont Road, N.W., Washington, D.C. We know that all of us of 1913 wish to extend sympathy to the families of our departed classmates. We have heard very little from them during the past few years, so if any of you fellows have any details concerning the above departed friends, your Secretary would appreciate more details for our future notes. . . . **Herb Shaw,** as always, sent in some suggestions and we quote in part: "In The Review you ask about the location of the next meeting place. We should choose a smaller motel where we would be alone and not sharing with some other class." As already noted we shall be unable to reune at Oyster Harbors Club, therefore we of the reunion committee will follow Herb's advice if possible. . . . **George Richter** is always very thoughtful and we appreciate, first his offering and secondly his philosophy and reports of his pastimes. We quote: "Enclosed please find the check for class dues. It seems little enough to give for all the service we fellows get. The further we go along in this wonderful life the more we realize that tempus does really fugit and I suppose that it is best that it is that way; otherwise, we would get bored stiff. This is the time of the year that we start thinking of a bit of respite from rigor vitae and inspect reams of road maps, hoping that we can be tempted to start some pleasant journey to parts where Old Sol dominates the situation. We plan to spend several weeks near Sarasota, starting about January 20; and then later in April we plan to fly out to Arizona for a fortnight. Are you folks taking a winter vacation? Of late I have been catching up on some of the classics of the late nineteenth century—Henry James again, and Andre Gide, Kafka, and others of that general vintage. To me they compare very favorably with the best of present day output. Also take a stab at verse writing from time to time although I confess that my style is not at all modern. Until next time." No, George, we doubt if we shall enjoy a winter vacation between our business and about six other extracurricular activities that can hardly be arranged. . . . **Fred Rich** is still perking down there in Miami and we quote: "Better late than never! So I'm sending you a check now, today, while the going's good. These are hectic days, Xmas, etc., and to heck with all the rest of the nervous world. One wonders what's doing for us elderly gentlemen. Will have to wait a bit and see what may be in the making as to the Cape next summer. Best of all good to you in every way, Sincerely Fred." . . . **Charlie Brown** is all squared away with the receipt of The Review, so now we shall expect a monthly letter from him. He writes: "We went to Garden Grove to have a Thanksgiving visit with our oldest son, Bill, and family; had a fine trip and were gone nine and one half days, getting back just in time to see a little blowing dust—not severe. It was cold, cloudy and clogged with smog on the West Coast—they can have it. On the return trip, we stayed overnight at the delightful Ghost Ranch Lodge in Tucson, Ariz., and while there I called up **Sam Knight** and talked to him. He lost his wife last year, he said, and has been blessed with family visitors since then. Tucson is a very interesting place with some of the craziest hills and dales in all the United States. People are perching houses on every crag to the northwest of the city, and thereby gain some wonderful views of the city and the mountains to the east of it. There are many dips in the roads where water collects during occasional heavy rains, so one might have to live on emergency rations sometimes. We also visited Shield's Date Farm in Indio, Calif., and listened to a talk on the 'Story and Sex Life of a Date,' complete with pictures but not samples. (Ed.'s note—who was the Date?) We also looked over the Salton Sea which is quite a pond. Salt too. The only fault we find with trips is that they cost too much, and nowadays we watch those dollars! Glad to hear you are still keeping busy, but you are welcome to the snow; it is winter here now, 50 degrees most days and sunny. Best to you and Roz." Well, Charlie keep on your toes and write often. . . . Set your sails everyone for June, 1965.—**George Philip Capen,** Secretary and Treasurer, 60 Everett Street, Canton, Mass. 02021

'14

We have a nice note from **Homer Calver** explaining how a temporary upset put him to bed during the period he had hoped to be at our reunion, and also telling of a new appointment as consultant with the Population Policy Panel of the Hugh Moore Fund. He appears still to be going strong. . . . Rich has sent me a letter he just received from **Jim Holmes** which is worth passing on. "Dear Rich: Thank you for your letter of October 22. I was sorry that I could not make our class's 50th Reunion. I can appreciate that you had a wonderful trip in the Mediterranean. We did this three years ago on a free lance basis and spent about three months there. Undoubtedly we saw many of the things you did. We had thought of taking a part of this time to visit India,

but we found the countries we were visiting so interesting that we did not go that way. So now, as it appears, we have approached India from both directions but have never gone there. On another trip we went as far as Malaya and Thailand, but we stopped there, turned back, and went home across the Pacific. I am glad we did this then because we were able to get into places like Cambodia and Saigon which are now, of course, out of the question. I have hopes that you will make a trip west and I certainly hope that you will let me know in advance, as Esther and I would like very much to have you visit with us and possibly spend some time on the large citrus ranch we own below Palm Springs. It is said to be one of the most beautiful ranches in the area. It is very scenic, as we own part of the mountain which surrounds the ranch of approximately 500 acres. In 1963 I was able to make a flying trip to Boston and did get a quick look at the tremendous strides which M.I.T. has made. Since then, of course, additional buildings have been put under construction. I cannot imagine you or **Charlie Fiske** retired. I haven't seen Charlie in so many years, whereas you and I have met two or three times. On that quick trip to Boston I saw **Alden Waitt,** but Catherine was not with him. They had come down from Maine where he had done a lot of painting that summer. Just a quick word about Holmes & Narver, Inc. I am still fully active, although, of course, I do not cover the ground that I used to. As we have a magnificient organization, the responsibilities of running the company are largely in the hands of other executives. To give you the scale of our operations, we employ roughly 3,000 people on work scattered around the world pretty broadly as well as in the United States. As you may know, the firm is primarily an engineering company, but we do a large amount of construction on which we are the engineers. We take on work on a lump sum or any other properly applicable basis. Very best regards, Rich, and don't fail to let me know when you come out this way. Sincerely yours, Jim."

Art Peaslee missed the reunion by getting floored by a heart attack shortly before it. The reports we have had, confirmed by a phone talk with Art, indicate that he has made a steady recovery and is now working about half-time in his contracting business. We all wish him well. . . . In connection with the death of **Ralph Perry** we had occasion to contact **Roy Parsell** who was a neighbor. He subsequently sent us the following letter on his letterhead as patent attorney and consulting engineer. "Dear Herman: I am glad that you called me today so I could give you the latest information about Ralph Perry. I enclose the clipping from the Torrington Register. I understand there was a short article in one of the Hartford papers. Ralph was apparently in good health when he went to bed Thursday evening yet never awoke. He had looked very well. Marjorie and I went down to Westport Sunday afternoon to see Bea. She has been bearing up well. The services were in Torrington where most of his old friends lived. **Chet Ober** and Pauline were there and sat with the family. I have been close to Ralph since we were about six years old—attending primary, grammar and high school together and of course most sections at M.I.T. as we both took the same Course II. I recall at one time, I guess grammar school, Ralph and I built a telegraph line between our houses—about 1500 feet. There was a big fire in the center of Malden in the Baptist Church, so the telegraph came into play to call the other fellow up to go down to the fire. There were many other little things I now began to recall. Ralph had an auto and I didn't. We went to a big dance somewhere over in Cambridge where one of the girls lived. The next day was exams and we passed with flying colors. Well, I can go on and on. You are doing a fine job with the class notes. Keep it up! I was sorry to learn about **Jim Hadley.** He lived near me in Malden and his sisters would come over to my house and as they were very musical we had lots of concerts. Sincerely, Roy."

As this is written in mid-December, Rich is about to take off for Rochester, Minn., for a several weeks' visit to his daughter and family, also usually a visit to the Mayo Clinic. . . . We have at hand a new address for **Russ Trufant,** 15 Frank Street, Middleboro, Mass. 02346. It looks like he is deserting the cranberry bogs on the Cape.—**Herman A. Affel,** Secretary, R.F.D. 2, Oakland, Maine; **R. P. Dinsmore,** President, 9 Overwood Road, Akron 13, Ohio; **C. H. Chatfield,** Assistant Secretary and Class Agent.

'15

Only five months to our 50th Reunion —you'll be there, of course! In our lifetime we can have only one of these reunions—so how about it? Messages from classmates all over our country indicate a widespread and enthusiastic interest in our 50th, so we should have excellent attendance to bring on many fellows we have not seen in a long time. By now you must have received the 50th Reunion Directory—a valuable book. It is the result of long hard work by your Reunion Committee, so hold on to it. Probably you have heard from your course representative, one of that valiant band who is contacting a number of classmates in each course. All these efforts go to make our reunion a success. . . . **Bill Smith,** I, recently retired from the Navy, celebrated his return to live in Boston with a generous check to **Ben Neal** and a bequest in his will for our 50th Fund. That's the spirit, Bill—many thanks. This should set an example for many classmates to follow. . . . **Herb Anderson** came through with a sizeable stock donation to Ben with these words: "Now that our 50th approaches I want to contribute a few shares of common stock for your Fund. I often read of you in the Class News and I know you are well and happy. On September 30 I retired but am on the advisory board of the Provident National Bank of Philadelphia. It requires two meetings per month." Nice going, Herb and many thanks.

Next month's notes will bring you the play by play on the big annual New York City Class Dinner of January 29. Bur and Larry have again set up a fine party with a large group of Classmates going over from Boston. . . . From the October, 1964, issue of I.E.E.E. Transactions, Power Apparatus and Systems, is the excellent write-up of our own **Phil Alger** which shows him to be outstanding in electrical engineering and mathematics. He was educated at St. John's College where he received his B.S. degree in 1912 and an M.A. (honorary) in 1915. In 1915 he obtained a B.S. degree in electrical engineering from M.I.T., and in 1920 an M.S. degree from Union College. From 1917 to 1919 he served with the U.S. Ordnance Department with the rank of lieutenant and again from 1920 to 1942 in the Ordnance Reserve Corps as major. He was an instructor at M.I.T. from 1915 to 1917. In 1919 he joined the General Electric Company and remained with the company until 1959. Mr. Alger is the author of three books: "The Nature of Polyphase Induction Machines," its revised edition "The Nature of Induction Machines" and "Mathematics for Science and Egnineering." He is also the author of about 80 magazine articles. He is a fellow of the I.E.E.E., the American Society of Mechanical Engineers, A.S.Q.C., and the American Association for the Advancement of Science. He is a member of the British Institute of Electrical Engineers, the Societé Française des Electriciens and the American Mathematical Society. Mr. Alger received the Lamme Medal of the A.I.E.E. for 1958 and the Schenectady Engineer of the Year Award for 1962. He is also a member of Eta Kappa Nu and Sigma Xi, and has served on numerous A.I.E.E. and I.E.E.E. committees.

It is sad to report the passing of two Classmates. **Aubrey D. Beidelman** died November 6 in Washington, D.C. . . . **Nassime S. Klink** died June 19 in Phoenix Ariz. Our sympathies go out to the families of these fine men. Plan for our 50th—I'll see you there!—**Azel W. Mack,** Secretary, 100 Memorial Drive, Cambridge 42, Mass.

'16

Here you are—here's all about it, from none other than our own ever-going president **Ralph Fletcher:** "Get out your calendar and circle these dates, June 11, 12, 13, 1965. That is the 49th Reunion weekend, the Friday, Saturday, and Sunday immediately preceding Alumni Day, June 14, at the Institute. We are pleased to announce we will have the same wonderful cottage arrangement at the Chatham Bars Inn on Cape Cod as we had on our 48th. You will receive notice of this in the mail in April in our call for reservations. In the meantime, mark the date on your calendar and start arranging your schedule so that you will be able to attend." Back in November Ralph and Sibyl returned from an enjoyable trip to London and Madrid (shooting, was it?) and were then "looking forward to some shooting in South Carolina. After that we expect enough snow in New England for some good skiing." How about that for

an example to follow—a pretty tough one for the rest of us '16ers—one that seems to be urging us all to keep going and doing and going and doing some more!! Come to think of it, didn't Ralph start Tech pretty young?

Don Webster writes that he and Nell expect to spend February and March and April in Palma, Majorca (look it up in your atlas, in the Mediterranean) with a few days at Barcelona. Don was writing to **Irv McDaniel** to get the real deep-inside dope on just what places are the places of places to visit and enjoy when in and around Spain. And that reminds us of a list that Irv gave us some time ago—the list, in his and Kay's opinions, of places to eat and what to eat in this man's world. They have been fortunate enough to sample food all over the world and have prepared a list of favorite places and dishes, and in the order of priority. We gave the first four in the November issue, and now give the next seven: "(5) Aragui, Moscow, Russia; woodcock stuffed with walnuts, sauce piquant. (6) Grand Hotel St. Louis et de la Poste, Autun, France; famous for epicures who make pilgrimages to this place from all over the world; expensive, but well worth it. (7) Tai Pak Fong (Floating Sampan), Aberdeen, Hong Kong; sea-food dinners. (8) Oskar Davidson, Copenhagen; lobsters. (9) Astiria, near Athens, Greece, Kilic Sis, Sis Kebabi or Bahcivan Kebabi (Circassian chicken with pine nuts); Kay liked Yesil Biber Dolmasi (stuffed green peppers) and Hunkar Beyendi (Sultan's Delight). (10) La Couronne, Grand Place, Brussels, Belgium; leave menu selection to maitre d'hotel, get reservations from your concierge and get a table by the windows; be there by 8 P.M. (11) Rambagh Palace, Jaipur, India; curry. (12) Cafe El Hambra, Marrakech, Morocco; Moorish dinner with orange blossom tea." If anyone wants a copy of the complete list of 20, just write your secretary. . . . **Obie Pyle** reports good health in Flourtown, Pa., and says he continues active on a retired basis in sales four or five hours a day. He just plain enjoys getting around calling on clients. Again we will look forward to a visit from Obie and Margaret down in Beach Haven Park on good old Long Beach Island "six miles at sea"—come June and July, that is.

By being a good boy on the second floor and doing as he was told, **Phil Baker** continued to make good recovery from his upset of late October. He was having lots of time to scrummage around in old newspapers and magazines, and forwarded a clipping about **Blythe Stason's** new job—taking the Frank C. Rand chair in law at Vanderbilt University in Nashville, Tenn., as reported in last month's column. Quoting from the clipping: "Since it was established in 1952, the American Bar Foundation" (from which Blythe recently resigned as administrator) "has grown to be the country's largest legal research organization with a staff of 45 persons and an annual budget of approximately $500,000. Its research embraces a broad field of subjects related to law practice, the administration of justice, and the public interest. The foundation is supported in part from sources within the profession, including the American Bar Association, the American Bar Association Endowment, and members of The Fellows of the American Bar Foundation, and in part through grants for specific projects from foundations and government agencies. Tribute was paid to Stason (21 years as University of Michigan Law School dean) for his leadership in developing the foundation to its present maturity and stature in a relatively few years."

Val Gooding writes that he has sold his home in Longmeadow, Mass., and that they have bought a place in Clearwater, Fla., (same sunny location chosen by Howard Hands and Stew Rowlett). Says he never thought he'd leave New England but he thinks he will like it there for it is nice to get out doors so much more than he could in Massachusetts.

This past summer **George Petit** corresponded weekly with Ed Short, general manager of the Chicago White Sox, "giving him the probable beginnings of long-terms slumps and rallies in their won-and-lost averages, because no one knows which club will win the pennant before the season starts. The White Sox have been very generous to me, keeping in touch with me about every two weeks." Thus George applies his unique system of trend analysis to all sorts of live data quite outside the realm of economics. From past data furnished he even looked into the matter of predictability of the number of 8' x 9' sheet loads of leaves your secretary could expect to collect and burn in the fall of 1964!

Kem Dean writes from Houston, Texas, where for years he has had an address that intrigues us: "K. Dean & Co., 913-14 Cotton Exchange Building 1, Houston 2." In mid-November he had this to say: "The only plans we have for the moment are for next week. One of our grandsons goes to St. Andrews School in Middletown, Del., and cannot get off for Thanksgiving. So my wife, a granddaughter about the same age as the boy, and I are flying to Philadelphia, will pick up a car and drive to Middletown with the boy's mother (one of our daughters), and drive down the Maryland peninsular under the tunnel to Norfolk and up to Williamsburg, Va., where we will stay a couple of days. We'll then drive to Washington and New York and return Sunday night, November 29." Kem says Houston becomes more fabulous almost daily—the Manned Spacecraft Center near there is a remarkable development "and has brought hundreds and perhaps thousands of new people. At the last census the population was close to a million (6th city in the country) and by 1970 predictions are it may be over two million."

In Vero Beach the **Earle Pearsons** continue to bask in the Florida sunshine "and miss the cold New England winters, not a little bit. We appear to thrive in the heat as we enjoy excellent health even though we have passed the barrier of 70." Earle says he keeps in trim through gardening and "playing at golf (no score mentioned)." Their travels this year took them to Ohio to visit their daughter and four grandchildren. He noted: "The oldest, Helen, now is 18 and entered Ohio State this fall to study to be a veterinary—a bit unusual for a girl but she is an excellent horsewoman and therein lie her interests." Except for a vacation trip to North Carolina, Earle says they have confined themselves to Florida, "visiting various parts of the State and seeing several of my former associates at B. F. Goodrich. Our next trip to New England will be in the spring of 1966 (the Lord willing) and we plan to attend the 1916 50th Reunion. Hope to see you then."

Howard Claussen is having a new flying bridge installed on his cabin cruiser. In response to our suggestion that a portion of philosophy be turned in, he sends the following most acceptable lilting sea-faring bit by You Know Who: "One ship sails East and one sails West by the self-same wind that blows, It's the set of the sails and not the gales which determines the way it goes; Like the winds of the seas are the ways of fate as we journey on through life, 'Tis the set of the soul that determines the goal and not the calm or the strife."

Jim Evans does it again we are told. Over the years he has consistently assuaged a compulsion, if that is the way to put it, to walk across or through every new bridge or new tunnel connecting either Manhattan Island or Staten Island to the outside world. In November it was the Verrazano Narrows Bridge that connects Staten Island to Long Island—and he did it even before the bridge was finished and opened to the public on November 21. He apparently performed sufficiently early—two weeks before opening day—so that he was forced to ride in a car with the resident chief engineer rather than walk past some few sections where work was still going on. Ask him about it—he has a story to tell!

Duncan Owler reports from Fall River, where before retirement he was president and general manager of the Fall River Electric Light Company, that "attending directors' meetings and reading help me to keep up to date on developments in the utility business in which I have spent most of my life." Further: "Organ music and golf (not in competition) seem to keep my nerves in good condition which in turn, I think, keeps arterio deterioration at a minimum, which is important at our age when you see so many younger ones pass out." Duncan now knows that "not in competition" is exactly the way we play golf at the Chatham Bars Inn at reunion time—for some of us, shall we say, it couldn't be any other way! So, see you Duncan in June at Chatham?

The October 14 issue of Women's Wear Daily tells of wider-than-ever-spread activities of **Barney Gordon** in a field that is of interest to all. The article notes: "Darlene Knitwear Inc. promises to circle the globe with its patented full-fashion knitted swimsuits through the medium of licensees. The Manchester, N.H.-based sweater and swimsuit company, with licenses in the 'United States, France, Spain, and Australia, is winding up talks with two new nations to be added to the list—Japan and South Africa,' according to B. D. Gordon, president." Further: " 'The interest of foreign manufacturers in the full-fashioned swimsuit feature is a

result of Darlene's accumulated knowledge in knitting, dyeing, finishing—all phases, acquired over a period of 43 years.' Mr. Gordon, who is an M.I.T. graduate in chemical engineering, said. 'This experience was attained in all branches of the apparel field—sweaters, hosiery, knitting tricot fabrics, and now swimsuits. This interest is also a result of competence in all phases, such as knitting, for example, where we can knit with two needles to the inch, to 50 needles to the inch; knit lace work, tricots, and produce with links and links. Moreover, we have the equipment to do all these things,' he said. 'I believe we are one of the few mills capable of crocheting trimming on a sweater or swimsuit by knitting, where as it is the general practice to do this by sewing,' he said."

We have word from **Larry Knowlton** (one of our long-term pre-Tech school companions; Sec.) that all goes well in Cumberland, R.I., where he has lived since retirement as executive vice-president of the Providence Gas Company.

Allen Pettee, down in Tryon, N.C., points out that "fortunately one cannot stop the human race" and he can accordingly report a very recent new grandson, raising the family of older son, Dr. Dan, to three. This brings Allen's "grand" total to three, three, and four, of whom seven are boys, and he adds, with his flair for statistics and quality control: "Some deviation! ! !" He goes on: "Further, all this year I have striven mightily to help produce a strong local Republican organization, but we brought forth only a mouse at the election, one justice of the peace." But "Discouraged" is not his middle name—if we remember him aright.

Jack Burbank reported good progress and "all is well" in mid-November after an operation and a short stay in the Cape Cod Hospital in Hyannis. Don Webster kept in touch with Jack during and after his "confinement."

Coke Flannagan writes from his retirement home in Inverness, Fla., that living in the country gives one little to write about. He says that quite aside from his major activity as a "putterer," he has been active over the past years "in Red Cross work, serving as County Chairman, Secretary, Treasurer, and plain board member at various times. Also for the past six years I have served as chairman of our local hospital board." He notes that son John is a physicist living in Springfield, Va., in work for the military but not in government employ. "So far," says Coke, "he has only one son just starting school."

And now we conclude by repeating what Ralph said at the outset—mark your calendar pad with a big "You know what!" on dates June 11, 12, and 13, and come all out to the 49th Reunion on the Cape. And keep the column full of news bits and philosophy by writing a little but writing often to any one of your class officers.—**Harold F. Dodge,** Secretary, 96 Briarcliff Road, Mountain Lakes, N. J.; **Ralph A. Fletcher,** President, Box 71, West Chelmsford, Mass.; **Joseph W. Barker,** Vice-president, 45 Beechmont Drive, New Rochelle, N. Y.; **Hovey T. Freeman,** Treasurer, 45 Hazard Avenue, Providence, R.I.; **Steve (T.D.) Brophy,** 50th Reunion Chairman, 470 Park Avenue, New York 22, N. Y.

'17

The home of the World's Fair is also the home of the Technology Club of New York which is the biggest value in town. Dues are only $4 a year. Of course if you make frequent use of the facilities of the Technology Club there is a small extra service charge. **Dick Loengard** is on the Board of Trustees and will be glad to hear from all of you. A round table for luncheon during the week is reserved for members of the Technology Club of New York in the center dining room at the Chemists' Club, 52 East 41 Street, New York City.

Our first historical review this month is from **Stanley Chisholm.** He writes: "Anticipating my early retirement after 30 years of federal service, some of my friends in Washington have prepared a sort of service history which appears in the October Naval Aviation News. Discounting the obvious exaggeration as to my personal accomplishments, it does give a clue to my nearly three decades past, and to this extent supplements the 30th Anniversary Class Report." The article, with pictures of Stanley and his lab follows: "The oldest BuWeps field materials laboratory, located at NAS North Island, is still headed by the man who established it nearly 30 years ago, Mr. Stanley L. Chisholm . . . In many ways the laboratory is Stan Chisholm. The professional interests, management philosophies and personal characteristics of its founder are reflected in every facet of the operation, from the enthusiastic attitudes of the staff to the integrity of the work accomplished . . . Aircraft corrosion prevention, engine preservation and anti-friction bearing reclamation are among the areas of research in which the lab has pioneered under Mr. Chisholm's guiding hand. Mr. Chisholm, now in his 70th year, was hired by the air station in 1936 to establish a chemical and materials lab. The founding staff included one chemical engineer and one assistant, a sailor. Operations increased gradually in the late 1930's and early 1940's and expanded rapidly during World War II. Among its wartime contributions, the lab instigated adoption of heli-arc welding of magnesium alloys. This enabled North Island to salvage nearly 10,000 aircraft wheels. Mr. Chisholm was on active duty as a naval officer from 1941 to 1946, serving first at North Island's O&R, then later, for two years, at BuAer in Washington as head of the chemical section of the Airborne Equipment Division. In 1946 he returned to North Island where he has remained. Today the modern lab is operated by 25 chemical and material engineers, metallurgists and related professional and technical personnel. In its early years, however, things were markedly different. A former associate of Mr. Chisholm, Mr. C. V. Brandon, recalled, 'The laboratory, when first I saw it, was confined to the very forward corner of Building 341 next to the fire house. It had something of the air of an alchemist's den because the windows were all painted over as a war measure and the lights were not really adequate. The place was loaded with all kinds of jelly glasses, salad dressing bottles and various other make-shift containers, all filled with various quantities of oil.' At the time, Mr. Chisholm was trying to determine the service life of aircraft engine oils. Typical functions of the lab now include determining causes for failure of aircraft parts; developing a bonding process for high speed sheaves; making changes to the NavWeps Preservations Manual; and designing a package container. But when Stan Chisholm can take time out from management duties, he continues the project which has spanned nearly his entire career—corrosion prevention. High strength, light weight alloys used in today's weapons systems make corrosion a critical and challenging problem. His achievements, however, are felt beyond the environment of the technical lab. Mr. Brandon notes that 'what is equally significant, but far less readily discerned, is the influence Mr. Chisholm has had upon the organizational and operational structure, not only of the particular Naval Air Station with which he chose to associate himself, but of all similar establishments in the Navy.' Further, he says, 'Mr. Chisholm was the first aeronautical materials engineer in the Navy, to the best of my recollection . . . He long ago became a well recognized elder statesman in his particular field of endeavor and has been looked to by management and worker alike for his sage solutions of the most intricate problems.' Mr. Chisholm has, through the years, performed thousands of tests on hundreds of painted electrodes, attempting to learn the substance which has the greatest value as a protective coating for aircraft. As a gifted teacher, he is dedicated to assisting younger scientists and engineers. Mr. Chisholm is reluctant to consider retirement. 'There is still so much to do, so many questions not answered, so many experiments not completed,' he says. Especially concerned about his pet project, he points out, 'The corrosion prevention project is going in the right direction. I'd really like to finish it.'" Our congratulations to Stanley.

Tharratt G. Best, of Boonville, N.Y., who runs the Tharratt House, sent in the following as he was leaving for a trip to Alaska last July: "It has been told me that I have led a rather colorful life, in which I concur—with certain reservations. First, it was graduation from Princeton, with a degree of B.S., followed immediately by M.I.T. Because of eyestrain, I was unable to graduate, putting my time to advantage in taking the test course with General Electric, but planning to return to M.I.T. World War I interrupted and I went overseas with the American Field Service early in 1917, being in a unit largely composed of M.I.T. men. I saw active duty in the Aisne and Vosges sectors. I returned to the United States in the summer of 1918 and was eventually commissioned first lieutenant in the Motor Transport Corps

at Camp Johnson, Fla. Then came two years with the Empire Gas and Fuel Company (Cities Service) in Oklahoma and Kansas, learning the oil business. I returned to the East in 1921 and served as assistant city engineer in Utica, N.Y., one year, then in private practice for another year. We laid out 34 new streets, a record to date. Family deaths compelled me to take the presidency of the First National Bank of Boonville, N.Y., a position I held for 35 years—now chairman of the board. I did not, however, completely abandon my engineering work. I surveyed a large part of Oneida County, including several large developments, one of which I owned. We also surveyed all of the county reforestation tracts. I served as president of the county bankers' association, acting mayor of Boonville, chairman of the Board of Education, chairman of the Municipal Commission for Light, Power and Water; technical adviser member of the zoning and planning boards; master of the Masonic Lodge; commander of the local American Legion post; and Military Order World Wars Chapter, president of the local Reserve Officers Chapter. I have written three works on local history, a book of verse, and numerous newspaper and magazine articles on history, banking, engineering, etc. I served for 35 years as a reserve officer in the Army and Air Force, of which seven were on active duty in World War II. I invented the 'landship' method of training soldiers as longshoremen for foreign port duty. I retired as a colonel, U.S.A.F., in 1952. My last active assignment was commanding officer of Fort Slocum. I was married in 1923 and have two daughters and three grandsons. I am presumed to be retired, but I cannot find where or from what. One of my greatest disappointments was not to graduate from M.I.T., and another was not to adhere rigidly to city planning—my first love—but wars and circumstances prevented. If I had my life to live over, I would choose a certain career and continue definitely in it if possible. However, all in all, life has proven a challenge and provided vibrant interest and great variety. I am most thankful."

A note from **Ken Bell** from his home at Mirror Lake, N.H., arrived recently. Ken wrote: "We have been so busy the last two months, preparing to go again to Peru, that it has not seemed possible to complete the Class of '17 questionnaire, which is so intriguing, but, tonight I am going to try it. But first, the news of classmates. We have seen the **Rudy Beavers** several times this summer (they live some 20 miles east of us) and talked more times with them over the telephone. Rudy has regained most of his old pep, and seems to enjoy life. This summer **Stan Lane** took three grandsons on a safari to see the wild animals in Africa. From **John Holton**'s description of Stan's movies of the animals, they are spectacular, and we anticipate viewing them next year. The Holtons spent two nights with us, after the Manchester reunion, and we had a grand talk fest and a picnic in the White Mountains. We started on our semi-annual visit to our children a few days after the Holtons left—Philadelphia, Baltimore, Cleveland and Pittsfield, Mass., included. **Walt Beadle** has replaced his sloop with a larger fiberglass boat which will enable him to sleep several grandchildren as well as the elder Beadles. The boat is based at the Annapolis Yacht Club. We are to work three months in Peru, with two of those in Arequipa—660 miles southwest of Lima, and at 7,500-foot elevation. The views of the 20,000-foot peaks surrounding it are spectacular, and we anticipate our stay there. The other month will be mainly in Lima (500 feet elevation) with an additional month loafing there. We expect to have an apartment near the Country Club, which has a spacious teenagers' pool, and two attendants to keep the teenagers away from the large adult pool—an admirable system, as we know from last year. So, if any classmates plan to visit this beautiful country, be sure to look us up. Just contact the U.S. Embassy, and they can tell you where we are. We shall be working for the State Department's AID. Our sole stop en route will be in Panama for three days, to shop and send stuff home, and to loaf beside the Continental Hilton pool in Panama City. . . . Now for the questionnnaire. (1) Experiences in life: Our life has been a happy one, and we have been rich in the things we enjoy: our homes in Marblehead, and later the two we now enjoy here. We decided to stay in New England, which doubtless reduced our financial take. However, we were able to retire on my 60th birthday, and these last 10 years have been the most exciting and rewarding of our lives, as we have traveled extensively, and also hope that we have contributed to the Point Four technical program in many countries. In addition, we have built ourselves into our adopted community, and feel well established here. (2) Accomplishments: I became the first technical man to become an officer in our old backward industry, leather, and, besides directing development programs, selected and trained men who have become leaders in the industry. I also participated actively in professional societies and held offices in them as well as participating in civic and church work. Best of all, we raised, educated and saw happily married, four fine children. (3) Disappointments: The slow, discouraging job of making progress in a backward industry made one doubt many times the wisdom of being stubborn in trying to lick it, and the great depression delayed 'arriving.' But final modest success was all the sweeter then. (4) Capitalization on what I learned at M.I.T.: The most important single course I took at M.I.T. was precision of measurements. I have rarely used the least squares and other technics, but the concept of concentrating on the larger items and forgetting petty ones is most important. (A 10 per cent improvement in an item that is 90 per cent of the company production, means 9 per cent improved results while 10 per cent on a 10 per cent item yields only 1 per cent improvement. Few schools instill this idea.) But the most important gain was associating with the giants: Dr. Lewis, Dr. Sedgwick, Dan Comstock, etc. Even more important was my year in the research laboratory of applied chemistry. I had worked at DuPont for a year on high explosives, and almost a year as Dr. Walker's aide at Edgewood Arsenal. By then, I knew something of how industry ticks, and in the year in the Research Laboratory, I was associated with an ununusual group who were footloose after World War I: Dr. Lewis, Dr. Walker, Bob Wilson, Bob Haslam, Alan Abrams, Scottie Venable. Sharpening one's wits by crossing swords with them was a real struggle, but fun when you won. (5) What would I do differently next time? Undoubtedly, under today's competition, I would work for a doctor's degree. I would choose industry again, but would be more choosey in selecting one that had the best management, which should mean the development of one's potential to the uttermost. But, I would again follow the concept of acquiring familiarity with industry before doing my graduate work (yes, and probably get married and not be able to continue.)" . . . Secretary's note: These biographical sketches are priceless, not only to classmates, but to others who read our column. Perhaps Don Severance, who, I understand reads all of the class notes, might suggest that undergraduates might find the experiences of our classmates stimulating and rewarding. Keep them coming.

Occasionally local newspapers record historical sketches of the business life of classmates. Such a sketch appeared in the Springfield (Mass.) News late last summer. The headline reads: "DeBell and Richardson Is World Tops In Plastics Independent Research". It goes on to say: "The 160-employee Hazardville Laboratories have completed 4,101 confidential projects for 766 clients in the last 10 years. Now 21 years old, the company owns 23 buildings and 70 acres of Hazardville. Growing at an average annual rate of 17 per cent, it is the world's largest independent research and development laboratory specializing in plastics. Established in 1945 by two already successful men, the company had its actual beginning in 1939 with **John M. DeBell**. A Great Barrington, Mass., native and veteran of World War I, Mr. DeBell started his chemical engineering with the General Electric Corporation. Eventually, he became affiliated with the Monsanto Corporation as head of all research and development. In 1939, he decided to venture into business as a plastics consultant. Henry M. Richardson, a 1925 graduate of the University of Colorado, also started with the General Electric Company. G.E. was, at this time, the major company using and researching plastic materials. In 1943, Mr. Richardson decided to leave his position as chief engineer over all G.E. technology and join Mr. De Bell as a plastics consultant. Starting strictly as a consulting team, client demand soon warranted an expansion and the two men set up an office-laboratory on the sixth floor at Three Post Office Alley in Springfield. It was also at this time, immediately after the war, that DeBell went overseas heading a team of experts for the government to study the remains of the advanced German plastics industry and to extract the

essential chemical and process know-how from the captured country. In addition to the numerous government reports, D and R published a book entitled 'German Plastics Practice' which made known the basic chemical and engineering technology of plastics which, up to that time, had been the guarded knowledge of a few companies in the country. In 1947 a fire in the Springfield building prompted DeBell and Richardson to look for new quarters which they found in Hazardville in an old wool rendering mill. Incongruously, the old buildings now house modern chemical and engineering facilities, physical testing laboratories, drafting rooms, machine shops and pilot plants."

Dean Parker has written a book, "Principles Of Surface Coating Technology," which is being published by John Wiley and Sons, Inc., New York City. Dean wrote: "I have been trying to get the proofreading done on my book and haven't had the energy to do much else. I was on my way down to the Alumni Officers' Conference in September and looking forward to visiting my New England relatives, when the roof fell in. I stopped at my son's house in Rochester, N.Y., for the night and could hardly walk when I got out of the car. My leg was all swelled up and very painful. I went to the University of Rochester hospital the next morning, and they told me I had a bad blood clot which can be very dangerous if it moves to the lungs or heart. It is the same thing as a thrombosis. They wouldn't let me keep on to Cambridge or even drive back home. They put me right to bed. I was there for 10 days and then Mrs. Parker came over by train and drove me home to the University Hospital at Michigan. They released me on October 29. My leg is still far from right, although it does not hurt even when I walk. I have to wear an elastic stocking in the daytime to keep the leg from swelling. I also have to keep off my feet as much as possible. I am not supposed to drive at all so Mrs. Parker will have to do the driving when we take off for Florida in December. I was sorry to miss the conference in September as I have found them very interesting and stimulating. I also wanted to get the details of the graduate courses in high polymers now being given at M.I.T. We want to get something started along these lines at Wayne State University in Detroit."

Our traveling assistant class secretary, **Dix Proctor** may remain at home in 1965 as you will note by the following: "We left home on May 14 stopping at Sun City, Ariz., for a few days (if anyone has lung or rheumatic troubles, this is an almost perfect spot to retire to) and then on to Los Angeles and San Francisco where we had several days to visit. We sailed from San Francisco on the American President Line freighter 'President Tyler.' All my life I have wanted to take a slow boat to China, but it turned out to be one of the fastest ones. The ship was one of two of the latest designs for speed, fast freight handling, and more attention given to passengers. Twelve of us had three lounges all fully air conditioned, which to us, took away lots of pleasure out of freighter travel as no port holes or windows could be opened. In nine days we were in Yokohama, Japan. We spent a couple of days there and then on to Okinawa, Lubic and Manilla in the Philippines, two ports in Taiwan, and Kobe, Japan. We left the ship at Kobe and had a four-day overland tour by car and trains seeing the sights between Kobe and Tokyo. We then returned to Yokohama where we rejoined the 'President Tyler' which took us back to San Francisco the day the Republican convention began. No hotel accommodations were available, but by good luck we got through customs and caught the last bus to Oakland for the only afternoon train east, arriving at Newark, N.J., on July 14. It was a most interesting and enjoyable voyage and for once we have no plans made for next year—maybe we'll try staying at home."

When **Ray Blanchard** was recovering very satisfactorily from a stroke, the doctors found it necessary to submit him to prostate operation. As this is written (December 4) Mrs. Blanchard was hoping that the operation—which was successful—would not cause too much of a strain on his already critical condition. . . . A random note on the brighter side concerns **Enos Curtin,** who slipped away to Ireland in the late fall to go fox hunting. He claims not to have bagged a fox but had a lot of fun galloping over the Irish countryside.—**W. I. McNeill,** Secretary, 107 Wood Pond Road, West Hartford, Conn. 06107; **C. D. Proctor,** Assistant Secretary, P.O. Box 336 Lincoln Park, N.J. 07035.

'18

Having just listened with great delight, despite fever, runny nose, aching back, and wheezing lungs, to the Metropolitan Opera broadcasting 'Rigoletto,' I am inclined to title this Opus 19, Number 18. The unctuous oily tones of the radio announcer would go on, at least in my imagination, to call this the Mid-Winter Sonata, except that it is being written in early December and has four movements like a symphony. The first movement, marked, adagio con molto anima, sets out adventurously with an airy passage from **Ted Wright.** "Mrs. Wright and I have just returned from a most interesting trip to the Orient, lasting about seven weeks. Ostensibly the reason for the trip was to attend the Olympic Games which we found intensely interesting. Also we continued in Japan, then to Hong Kong, Bangkok, Singapore, Manila, Honolulu, San Francisco (where we visited one of our sons and his family) and home. The second item is that I have been selected as President of Associated Universities, Inc., which is the parent company for Brookhaven National Laboratory and the National Radio Astronomy Observatory at West Virginia. This organization consists of representatives of nine universities of the East of which M.I.T. and Cornell are two. I was associated as a trustee of A.U.I. for twelve years as Cornell's representative when I was vice-president for research at Cornell." . . . The second movement is marked assai presto (dv/dt) and achieves a remarkable effect when the second clarinet pours sand into the tuba. Florida sand, of course. **Harry Le-Vine** takes over the baton: "In June, 1963, as we were leaving the site of our 45th Reunion, you gave me a card with your address and requested that I write you. I have finally gotten around to it, partially due to the fact that I wanted to keep my promise, and partially because there have been some changes which I thought might be interesting. Shortly after seeing you in June we sold our home in Detroit together with all the furniture, and headed for Miami Beach where we had spent the last 18 winters. We intended to find a furnished apartment on the ocean front and just look around until we decided exactly where we wanted to settle. Both my wife and I love being right at the ocean, and we expected it would be difficult to find good furnished apartments where we wanted to be. Instead, we discovered a new high rise apartment under construction which had all the things we dreamed of, such as a heated pool, beautiful patio, lovely community room, fine coffee shop on the premises, sauna baths, etc. We had promised ourselves we would not lease and furnish an apartment, but when we went out on the private balcony at the 11th floor which leads from our living room, and saw three bodies of water, the ocean, the Indian Creek River, and the intercoastal waterway, together with a view of the city of Miami and Miami Beach, we stopped right there and signed the lease. Every morning at about 6:30 or 6:45 I go out to look at the view; I get a thrill each time. So much for that. Shortly after coming here I got in touch with the secretary of the South Florida M.I.T. Club, and expressed a desire to join, and to offer asistance if I could be of any help. The club here has been inactive and we are now trying to reactivate it. We do have the records from Cambridge, of course, which give us the names of the alumni in this territory, but they seem to be incomplete. I did get in touch with **Fred Philbrick** who attended the 45th Reunion with his wife. We are planning to get together soon. What I wish you would do, if possible, is to give me a list of any of our classmates who reside in this area. I will then endeavor to get in touch with them. I meant to tell you also, that Mrs. Le Vine and I had all plans made to go to Boston last June. We were to leave here the latter part of May but the man higher up had other ideas. I had a sudden acute attack of the gall bladder and went into the hospital for surgery. That ended that. I do hope to come north next June. Seacoast Tower, Apartment 11K 5225 Collins Avenue, Miami Beach, Fla. 33140."

The theme in this movement also contains an interesting variation from Fred Philbrick. "Our hurricane season is over and so are the elections. Both produced a lot of wind and left a few scars. Fortunately we had little damage due to the hurricanes; one tree and some shrubbery. This has just about been repaired by mother nature. I am not so sure about the elections. Our weather continues unusually warm, which suits me just right. Our mango tree is in full bloom about two

months ahead of schedule. Harry Le Vine has moved here and hopes to see many classmates during our interim reunion at the Wianno Club, Osterville on the Cape next June 11 to 13."

The third movement is marked pizzicato, and is to be played with short, clicking sounds similar to the snapping of a steel trap. **Sax Fletcher** says, "I have been amused by your comments concerning the woodchuck trap. Maybe the woodchucks are a tiny bit more stupid in the lush Greenfield area than in the lean woods of Jaffrey, or just maybe one F.A.M. is not well versed on the habits of the thickset Marmota Monax of northeastern U.S.A. Anyhow, I caught three woodchucks in that trap, all at different times." Well, Sax, both you and I had boyhood farm experience. Now, you offer the varmits a vegetable garden, and the local cognoscente among them take a liking to my flowers. I have shot some in the eyeball from a hundred feet, and trapped others where they emerge from my ledge, but no self-respecting, Jaffrey woodchuck would fail to walk around so obvious a hazard as what I saw among your tomatoes. On the other hand, not even the skill of the most astute local trapper has ever caught three of them at once in the same trap! His letter continues, "We were at the farm for Thanksgiving, 21 by exact count, but after reading about the storm you had in early December I am glad to be in a warm apartment this morning. On the way to the farm we stopped for lunch at the Sterling Inn where we found both **Mahonys** back on the job. Rose and her sister both suffered broken hips this summer. Rose said she had to learn how to walk all over again. **Ralph,** like some of the rest of us is growing deaf, but seems otherwise in good shape. Louise joins me in sending our best wishes."

The final movement is short, very brassy, and is marked andante, whatever that means. It seems that some composer in Boston has asked for permission to turn **Alexander Magoun's** book, "Amos Fortune's Choice," into a musical. This explains why the closing measures of the symphonic work being described here are a direct steal from Sir Arthur Sullivan, the meaning of their inclusion is clearly a choir of old authors singing, "It may be that only in heaven, I shall hear about that again." What the brethren need to hear now is that I am guilty of gross negligence in not checking to be sure that my secretary corrected our address following these notes. We have not moved, but Uncle Sam has. Consequently, now signing off is—**F. Alexander Magoun,** Secretary, Jaffrey, N.H.

'20

Let me remind you again that if, by any chance, you have not received the letters about the 45th Reunion at Red Lion Inn next June, you should get in touch with me or with the reunion chairman, **Frank Bradley,** 11 Pine Ridge Road, Reading, Mass., for full information. As it stands, we expect record attendance and an occasion that you will surely not want to miss. Let us hear.

Word has just been received of the death, on November 20, 1964, of **Francis L. Mead** of 10 Schuyler Avenue, Rockville Center, N.Y. I have no details at this writing. . . . **James L. Dean's** present address is 8 Barrington Drive, Andover, Mass. . . . **Harold Bennet** writes from his home at 5072 Tennyson Street, Denver: "I have just returned from a seven months' tour of the British Isles. I regret that I shall be unable to attend the reunion as my time next June is booked for a summer's stay in Alaska. I enjoyed seeing the Firth of Forth Bridge in Scotland and passed under it by boat also, to view it from all angles. I am enjoying retirement, as the above indicates." Sorry you can't be with us, Harold.—**Harold Bugbee,** Secretary, 21 Everell Road, Winchester, Mass.

'21

Two of the corps of well-known writers from the Class of 1921 have their excellent productions featured in prominent publications. Via a welcome letter from **Edouard N. Dubé,** we learn that Captain **Elliott B. Roberts,** affectionately known as "Mr. U.S. Coast and Geodetic Survey," has a most interesting article on the Aleutian Islands in the October, 1964, issue of The Americas, the monthly journal of the Pan-American Union. Elliott spent a great deal of time in that area, and we well remember a vivid description he wrote for this column, just as World War II got under way, from a ship stationed in Unalaska Bay, near Dutch Harbor at the eastern end of the Aleutians. Elliott makes his home in Washington, D.C., at 4500 Wetherill Road. . . . **David O. Woodbury** is the author of a gripping story of real life in his native Maine, "Grandpa and the Atlantic Ocean," which the September, 1964, Reader's Digest reprinted from "Down East, the Magazine of Maine." Modest silence from the Oracle of Ogunquit probably indicates his concentration on the next in the series of novels he has undertaken since the appearance of his seventeenth science book. . . . Another famous writer and one time editor of Aviation magazine, has been honored with the appointment as director of the extensive Air and Space Museum of the Smithsonian Institution in Washington. **S. Paul Johnston** has retired as executive secretary of the Institute of the Aerospace Sciences and its predecessor organizations. He had continued in that capacity when the Institute was merged with the American Rocket Society under its current name. Paul is also a former national president of the Institute of the Aeronautical Sciences. We hope he takes extra good care of the World War I "Spad" at the Smithsonian, which was piloted overseas by our good friend Ray Brooks of the Class of 1917.

Chick and Maida Dubé have showered us with extravagant but nevertheless appreciated verbal bouquets for these historical sketches of the Class of 1921. We are indebted to them for the news of Elliott Roberts and for a fine letter which reads, in part: "You have probably received an amazing book from **Helier Rodríguez.** Coming from a country which is so woefully enmeshed in a communist regime, he appreciates the terrible results all the more. Obviously, he wants everyone to get its message. Last week, I ran across **Theodore P. Spitz** in an elevator here in Boston. I hadn't seen him for 43 years. Ted is a civil engineer with the City of Boston in the building department, with headquarters at the City Hall Annex. Ours has been a very eventful summer. With eight grandchildren, things are bound to happen and they do—such as two-year-old Michael breaking both bones in his lower leg and being bitten by an otter (sic), and then stomping around on his rigid cast like Long John Silver. The Jones' (our daughter Lucienne) remodeled their home on Casco Bay, resulting in practically a new house. This, too, had its near tragedy when lightning struck a second floor spot which Harold had just left to go for some nails. We still plan to visit you, but my office is demanding 150 per cent of my time. Our greetings to you and Mac." Chick is a consulting engineer with offices at 120 Tremont Street, Boston. He lives at 216 Woburn Street, Reading, Mass.

A grand note from **Laurence O.** and Mary **Buckner** says that they have moved their home to 2630 Durham Road, Hains Acres, York, Pa. Appropriately, the retired sales manager of the Metropolitan Edison Company of York is now only one block from Cambridge—road, that is. His excellent map locates their residence near the intersections of U.S. 30 and 124 with U.S. 83, about three miles east of York Square. . . . Colonel **Holland L. Robb** reports his home address as 1126 Sourwood Drive, Chapel Hill, in our native state of North Carolina. . . . **Eugene W. Rudow,** President of Scientific Supplies Company of Seattle, Wash., says he now makes his home at 8457 Midland Road, Bellevue, Wash. 98004. . . . Special social item for **Saul M. Silverstein** about the son of our late classmate, Prince Songkla Mahidol: Datelined Bangkok, Thailand, December 5, 1964, the Associated Press reports that King Bhumibol observed his thirty-seventh birthday. Flags were flown throughout Thailand, houses and streets were decorated, there were free stage shows and fireworks and a general three-day holiday was proclaimed. . . . Sincere sympathy is extended to **Allen D. Addicks** on the death of his father, Lawrence Addicks, '99.

We are most thankful to **Philip R. Payson** for a splendid letter that confirms an article on his retirement from the ball and roller bearing industry, which appeared in the Midwest Purchasing Agent magazine. Phil originally joined the Boston office of S.K.F. Industries, Inc., in engineering sales and went to the Cleveland office in 1929, being appointed district manager there in 1946. He says: "I agree with my fraternity brother and roommate, **Franklin T. Flaherty,** that you surely take your job as secretary real seriously. Your welcome news in the November issue of The Review must have been close to 5,000 words. S.K.F. retired me almost a year ago and I am to get the 40-year service

award at the Philadelphia headquarters on November 12. Marion and I will continue from there to spend a few weeks at Miami Beach. By the way, she had a lead part last summer in a local little theatre production of 'Strange Bedfellows.' We recently went to New York to see some shows and returned via Boston and Natick, where we visited with our daughter, Beverly, her husband, Frank McNally, and Kevin, aged 7, Kimberly, who is 3, and year-and-a-half old Kerry. Our other daughter, Audrey, is still teaching the second grade in South Euclid, Ohio, and lives with us. **Paul** and Ruby **Hanson** recently drove out to see us in his new Cadillac and we enjoyed their visit. They planned to drive on to Boston and then to Nova Scotia before returning to his real estate business in San Francisco, where their son, Paul, Jr., also lives. I seem to find plenty to do and am carrying on consulting work as a rolling bearings application engineer. We still live in the home we purchased in 1931 and are not yet considering pulling up stakes. I built a fiber glass shell fifteen-foot boat with a thirty-five horsepower outboard motor and hauled it to New England a few times. Lake Erie is a little rough for small boats most of the time, so I sold the rig. I completed the Coast Guard Auxiliary small boat course last winter but decided I could use the garage room to better advantage. Have just read that **John Barriger** is thinking of retiring from the presidency of the Pittsburgh and Lake Erie Railroad. We enjoyed the fortieth reunion of the Class and are looking forward to the next one." These Lambda Chi Alpha say the nicest things about Class **News**.

We have enjoyed to the fullest several recent telephone conversations with **Alexander D. Harvey** of the firm of Harvey, Leith and Company, Inc., 711 Fifth Avenue, New York, N.Y. 10022. Dan is still occupied with the financing of small business enterprises, following his previous association with the Small Business Administration in New York and in Washington. He lives in New York City at 133 East 64th Street and has a number of civic and community interests, including trusteeship of the Hospital for Special Surgery. . . . In his role as an Honorary Secretary of M.I.T., **Samuel E. Lunden** of Los Angeles, one of our famous group of West Coast architects, represented Technology at the Golden Jubilee of Jesuit Higher Education at Loyola University of Los Angeles. . . . **J. Rowland Hotchkin** has been elected a director of United-Carr, Inc. He has returned to the board after retiring last year from the presidency of the Palnut Company of Mountainside, N.J., a division of United-Carr, on reaching the compulsory retirement age. Hotch, who lives at 1 Slope Drive, Short Hills, N.J., founded the Palnut firm in 1924. . . . Maxine and your Secretary enjoyed an excellent meeting of the M.I.T. Club of Northern New Jersey at the Robert Treat Hotel in Newark with a most interesting speaker on the short haul transportation problem in the metropolitan area. It would have warmed the cockles of John Barriger's heart to hear that existing railroads and not new highways are the prime answer to the problem. Also in attendance were **Joe Wenick,** treasurer of the club, and **Sumner Hayward.** Joe has retired as chief engineer of Lightolier, Inc., and is engaged in consulting work. We are glad to be able to report that Betty and Sumner, both of whom have undergone surgery during the past year, are in good health and enjoying Sumner's retirement from the New York Telephone Company.

John J. Healy, Jr., has written a grand letter of explanation of his permanent change of address from St. Louis to his native Massachusetts. The letterhead reads: "Enterprise Associates, Venture Analysis, 1 Crescent Avenue, Scituate, Mass.," and Jack says: "Retirement it is and I like it. Monsanto and I parted company on August 1, after 42 years and 9 months of mutual admiration. Maisie and I returned to Scituate and the home that we have lived in during the summer for many years. We are now looking forward to some good old New England snowstorms, something we haven't seen for thirteen years. No Florida or around-the-world cruises for us. As the letterhead indicates, I am doing a little consulting. So far, it keeps the boat painted and doesn't interfere too much with training my dog and shooting AT pheasant and duck. Come up and see us sometime." Previously all over the map as a member of Monsanto's corporate planning staff, and a past national vice-president and national president of the American Institute of Chemical Engineers, we hope the indication of permanence in Jack's current proximity to Cambridge will afford more opportunities to see him at Alumni Day and at our 45th Reunion next year—provided, of course, that his duties as commodore of the yacht club are not too demanding. Thanks a million, Jack, and best wishes for top enjoyment of your retirement.

Dr. **Augustus B. Kinzel,** Vice-president for Research and Engineering of Union Carbide Corporation, is one of the members of 1921 who is continually being recognized with various honors for his achievements and who is consistently in the headlined news for a broad range of activities and contributions to governmental, industrial and community projects. Stevens Institute of Technology has announced Gus' appointment with four other distinguished research executives to form a research advisory committee for the institution to consult in connection with its research projects, comprising solid state physics, molecular biology, solid rocket fuel combustion, thermonuclear fusion and plastics science and engineering. . . . A personal note from **Ralph M. Shaw, Jr.,** the squire of Shawnee Hall, Beverly, N.J., has a parenthetical reference to the demands being made upon him by local service clubs and other organizations for his illustrated dissertation on Israel, where he visited on his last trip abroad. Rufe is an excellent writer and has made full use of his powers of observation. We can well understand that any presentation he makes would be well received, especially in view of the complimentary reception of his notes on the trains in Italy, appearing in last month's 1921 news. . . . Thanks to Chick Kane, '24, Director of the Amity Fund, we have an advance copy of the first letter to the Class of 1921 from our and the Institute's first Class Estate Secretary, **Edmund G. Farrand** of Kinchafoonee Lodge, Leesburg, Ga. You now have Ed's explanatory letter and a convenient return card as a means of exploring further with Ed and D. Hugh Darden, Technology's full-time Estate Secretary, the endless avenues of deferred giving to fit your future plans and at the same time be of tremendous benefit to M.I.T. Ed is still teamed with **Larc Randall** as our Class Agents in the effort to guide the total current alumni giving over the $1.5 million mark during this 25th anniversary of the Amity Fund.

We deeply regret to report the passing of three members of the Class and take this means of extending to their dear ones the sincerest sympathy of the entire Class. . . . **Philip Exton Guckes** died at his home in Camden, Maine, November 8, 1964. Born in Philadelphia on April 12, 1901, Phil prepared for Technology at the Germantown High School. At the Institute, he was a member of Phi Sigma Kappa, the Chemical Society, the news staff of The Tech and its photographic editor. He was graduated with us in Course X and then joined the Charles S. Walton Company, Philadelphia leather belting specialists. In 1925, he became associated with the American Non-Gran Bronze Company of Berwyn, Pa., and was named its secretary-treasurer. He was later elected president, a post he held until 1950, when he moved to Camden and became president of the Passmore Lumber Company there. Prior to his move to Camden, he had also owned the Philadelphia Yacht and Aircraft Agency. During World War II, he served for two years as a lieutenant in the U.S. Navy. His memberships included the Cruising Club of America, the Corinthian Yacht Club of Philadelphia and the Camden Yacht Club. He was the author of various articles in Yachting magazine. A member of Rotary and a director of the Camden Community Hospital and the Wayne (Pa.) Title and Trust Company, he had also been active in the Racquet Club of Philadelphia and the Philadelphia Skating Club. He is survived by his wife, the former Eleanor W. Scott of Philadelphia; two daughters, Mrs. Evans M. Harrell of Cincinnati, Ohio, and Mrs. Richard Krementz of Morristown, N.J.; a brother, Robert R. Guckes of Pueblo, Colo.; and six grandchildren. . . . Lieutenant Colonel **George Macdonald Herringshaw** died on January 6, 1964, at Arcadia, Calif. Born July 29, 1894, in Cleveland, Ohio, he was appointed a second lieutenant in the U.S. Army in 1916 and later commanded the 7th Cavalry in Texas. Following attendance at the Motor Transport School, Ft. Holabird, Md., he was transferred to the Quartermaster Corps and assigned to studies at Technology, where he was associated with us in Course II. He then served various assignments as maintenance officer and shop superintendent of Ft. Holabird, as the coast defense quartermaster in the Canal Zone and as commanding officer of the Atlantic Motor Transport Pool. He attended the Quartermaster Corps School in Philadelphia and then commanded the First Division Quar-

termaster Train. Following a period of instructing in the regular army and the New York National Guard, he became assistant to the Sixth Corps Area Quartermaster in charge of transportation. He was retired from active duty in 1938. His decorations included the Mexican Border Service Medal and the World War II Victory Medal. . . . Brigadier General **Harvey Clark Allen** died on December 12, 1963, at Houston, Texas. A native of Craftsbury, Vt., he was born on March 21, 1888, and attended the University of Vermont, where he obtained the B.S. degree in 1910. He was appointed a second lieutenant, Coast Artillery Corps, in 1910 and served the corps at various posts in the U.S. and in the Canal Zone. On completion of the course at the School of Fire, Ft. Sill, Okla., he served as an instructor and then went overseas with the A.E.F., being assigned to the 3rd Field Artillery Brigade in France as adjutant. After World War I, he was stationed in the office of the chief of Coast Artillery, Washington, and then was assigned to studies at Technology. Following receipt of a master's degree with us in Course VI, he became executive officer in charge of the sub aqueous sound ranging section, Ft. Wright, N.Y. He was a student at the Coast Artillery School, Ft. Monroe, and then attended the Command and General Staff School, Ft. Leavenworth, graduating at the head of the class. After subsequent graduation from the Army War College, Washington, he served as chief of the publication and correspondence section of the War Department General Staff. He saw service in the Philippines as commanding officer, 92nd Coast Artillery, and as officer in charge of harbor defense plans and training. He returned to the States as chief of the miscellaneous section of the war plans division and later as chief of the operations section of the general staff. In 1939, he became harbor defense and regimental commander and commanding officer of the 13th Coast Artillery in Florida. After his appointment to the rank of brigadier general, he served as commanding general, Antiaircraft Artillery Training Center, Camp Hulen, Texas, until his retirement in 1945. His decorations included the Legion of Merit; Mexican Border Service Medal; World War I Victory Medal with clasps for Champagne-Marne, Aisne-Marne, St. Mihiel, Meuse-Argonne and Defensive Sector; American Defense Service Medal; American Campaign Medal; World War II Victory Medal. He is survived by his wife, Mrs. Ruth S. Allen, 144 East Oak View Place, San Antonio, Texas.

Our 45th reunion in June, 1966, may seem a long way off to those in the eastern portion of the country, but if you are at a greater distance you and your wife may wish to do some early planning for attendance. One of the many attractive features of our meeting place at the Griswold Hotel and Country Club on Eastern Point in Groton, Conn., is the ease of transportation and the unusually wide variety of media which serve this spot in historic southeast Connecticut. If you drive, good turnpikes extend to both the Boston and New York areas. All New Haven passenger trains from New York and from Boston stop at New London, Conn., which is only a little over two miles from Groton. Regularly scheduled northbound and southbound flights of Allegheny Airlines stop at the Groton Airport. If you come in your own boat, the Griswold yacht landing is right in front of the hotel. Everyone, including the ladies, will be interested in the numerous nearby tourist attractions, such as the launching site of atomic-powered submarines in Groton, the Coast Guard Academy, Mystic Seaport and Museum and the Stratford Theatre. If you need more specific information at this time, write to Reunion Chairman **Mel Jenney** at the address below. And in this short month, your Secretaries will appreciate a news note, too—however short or long it may be!—**Carole A. Clarke,** Secretary, 608 Union Lane, Brielle, N. J. 08730; **Edwin T. Steffian,** Assistant Secretary, c/o Edwin T. Steffian and Associates, 376 Boylston Street, Boston Mass. 02116; **Melvin R. Jenney,** 45th Reunion Chairman, c/o Kenway, Jenney and Hildreth, 24 School Street, Boston, Mass. 02108.

'22

Your Secretary is nervously dictating these notes while being held down by the shoulder strap of his golf bag and held up by one foot on the step of the Augusta airplane and while being mentally confused with the light snow fall in Buffalo and hopes for warm, sunny days in Georgia. **Herbert C. Ham** sends greetings to all from Pittsfield, Mass. He is on the retired list and looking forward to our get-together next year. . . . A clipping from the Springfield paper tells of the death of **Walter E. Lennon** of Adams, Mass., where he had resided since 1922. Walt had been active in the Kiwanis Club, a member of the Forest Park Country Club and St. Thomas Church. He was chairman of the trustees of the W. B. Plunkett Hospital and had been chairman of several Red Cross Fund raising drives. The sympathy of our Class goes to his two sisters of Natick. . . . **C. George Dandrow** may now be reached at Box 704, Chatham, Mass. It will be nice to have George nearer M.I.T. and have his continued active support. George and Catherine have been busy overhauling an old, historical dwelling located on the ocean, "a short hop down from the Chatham Bars Inn." Can you imagine George wearing a carpenter's apron, a pencil behind his ear?

Our Assistant Secretary, **Oscar Horovitz** of Newton is given a great deal of praise in the December issue of Better Home Movie Making magazine. A picture of Oscar in his trophy room with many of his national and international awards of certificates, diplomas and cups is most enjoyable. Your Secretary really prefers the smaller picture of Oscar and Mary on the steps of a jet taking off on a camera safari. Oscar has also produced many public service films for the Community Chest, Jewish Philanthropies, M.I.T., Hadassah, the American Technion Society, and for Youth Aliyah. He still finds hours for his real hobby—golf, but his first love is certainly photography. . . . A letter from **Chester W. Greening** of Westport, Conn., tells about his retirement after 35 years with Alcoa. He now lives 30 paces from Long Island Sound and hasn't been able to figure out how he found time to go to work before retirement. He continues: "Being a disciple of the late Eddie Miller, I read about boilers not boats. When I acquired 'the Queen Alice', a little 16-footer with a 50 H.P. kicker, I took instruction from the Power Squadron. Thanks to Al Bower's invention of a simple nautical protractor, I passed and became a member of the squadron. All '22 sailors should invest in the Bower's Protractor, it's worth three times the $2.50 price. It will keep you off the rocks, while you are fussing with complicated devices. I am going to make time to see **Dunc Linsley** and **R. A. Stone** who live close by. I ran into **Maurice Williams** and the late **Jack Knight** at the Inn in Orleans on the Cape a while ago. This reminds me to change my standing invitation for a Stein on the Table from Orleans to Westport. Make it soon." Devoted thanks to Chet for his comments —from your secretary, who needs other contributors.

The Order of the Sacred Treasure, Third Class, has been presented to **Laurence B. Davis** on behalf of Emperor Hirohito of Japan. Larry recently retired as executive in charge of international sales for Socony Mobil Oil Company. He was honored for his contribution to improved relations between the United States and Japan. The presentation was made at the Japanese Consulate in New York by Consul General Togo. Larry is now chairman of the Oceanic Process Corporation of 120 Wall Street and lives in Osterville, Mass.

We send best wishes to **Dave Minton, Jr.** for a successful and rapid recovery from his cataract operations. It really doesn't seem right to have Dave out of circulation even temporarily. . . . **Wilfred M. Thomson** is enjoying his San Francisco location with Nash Engineering Company. Tommy has rolled out the welcome mat for anyone coming by 681 Market Street, 94105. . . . We send our personal regards and sincere sympathy to the family of **Arnold W. Milliken** who died after recently retiring to Westport, Mass., from his position as executive vice-president and general manager of the New York State Electric and Gas Corporation. Arnold joined the company in 1939 and in 1945 was given charge of operations in Binghamton. His dedication was recognized in 1955 when a new generating station on Cayuga Lake was named for him. In recent years he has been closely associated with groups supporting research in nuclear generation and was a member of the Atomic Power Development Associates and High Temperature Reactor Development Associates. Surviving are his widow, Violet, and a daughter Mrs. Patrick Finleon of Dalton, Mass. . . . Our sympathy is also extended to the family of Vice Admiral (Ret.) **Willard A. Kitts, 3d,** who died in November of a brain tumor at Bethesda Navy Hospital after a long and successful Navy career during which he was awarded the Navy Cross and three Legion of Merit awards. He retired in

1951 and joined the General Electric Company as manager of the Atomic Products study group. A few of Admiral Kitts' other awards include the Order of Commander of the British Empire, China's Order of the Cloud and Banner, the Purple Heart, Grand Fleet Clasp, American Defense Service Medal and the Asiatic Pacific Area Campaign Medal. . . . Our sympathy is further extended to the family of **Valentine Gahnkin** of Beacon, N.Y. —**Whitworth Ferguson,** Secretary, 333 Ellicott Street, Buffalo, N.Y.; **Oscar Horovitz,** Assistant Secretary, 33 Island Street, Boston, Mass.

'23

Your Vice-president **Howard F. Russell** again takes the lead in sending in news of classmates. When you have news of a classmate you are urged to stop for a moment, write it on a slip of paper and forward it to your secretary. It will be appreciated by many as a news item. In a letter to your secretary, Howard reports: "Had a nice letter from J. Modesta Ledesma, who is one of the sons of our classmate **Ernesto Ledesma** of Manila. He said his father may be coming to Boston next year, in which case he will look us up. Ernesto has quite a family—four boys and a couple of daughters. Most of them are married and have a couple of youngsters apiece. Modesto spent about 30 months with us down at my office in White Plains and thinks the experience was the best thing that ever happened to him. He is now in the advertising business and won the top award for Distinctive Advertising in 1964. Ernesto is now consultant to the public service companies in Manila and has built himself a new beautiful home. His first wife, his mother and all the children died as a result of malnutrition during the Japanese invasion and occupation." . . . A note from **Maynard L. Flickinger** indicates that he intends to retire August 1, 1965. He says, "Last August we had a trip to the Northwest, Union Pacific train, and all conducted. Most satisfactory. The scenery, weather and gardens were wonderful." . . . The following changes of address have been reported: **Emil S. Birkenwald,** Apartment A3, 3768 Peachtree Road, N.E., Atlanta, Ga. 30319. . . . **Thomas B. Drew,** Room 12-190, M.I.T., Cambridge, Mass. 02139. . . **Erwin G. Schoeffel,** 148 Wilson Hill, R.D. 1, Massena, N.Y. 13662. . . . **Raymond H. Starr,** Koch Supplies, Inc., 1411 West 29th Street, Kansas City 8, Mo. . . . **Bernard L. Zangwill,** Apartment 608 I, 55 Highland Road, Bethel Park, Pa. 15102. —**Forrest F. Lange,** Secretary, 1196 Woodbury Avenue, Portsmouth, N.H. 03801; **Bertrand A. McKittrick,** Assistant Secretary, 78 Fletcher Street, Lowell, Mass. 10852.

'24

Maybe you will remember mention in these notes some time ago of **Frank Reeves'** hobby, organs. Now come some very intriguing details. Seems the heyday of the movie organ business was from 1910 to about 1925. The advent of the talkies was a death blow, and many of them found their way into the hands of organ buffs, including Frank. Initially he planned on installing his in a rented house, but the owner didn't like the idea of 6" holes being bored in his floors, so Frank built a house around his Wurlitzer. That was five years ago. Now he is rebuilding the whole gadget. "Not sure I will come out any better than the original builder, but I'm having a lot of fun—and it's amazing how many problems come up." Sounds logical to your secretary. Just in case there are others in the class with a like interest, this is a four-manual, four-rank organ with added Vibracord, Xylophone, and a "Toy Counter" consisting of whistles, bells, horns, etc. Must make quite a commotion when it's going full blast.

Via **Hank Simonds** comes a copy of the Sabah Anglican Observer from Jesselton, Malaysia. It starts with a letter from James Jesselton, that is the Right Reverend **James C. L. Wong:** "I have given notice at the last meeting of the Diocesan Council that I shall resign from my office on the 30th September, 1964. The reasons were given in my Charge to the Diocesan Council published in the last number." So it looks as though Jimmy has completed the second phase of a distinguished and varied career. . . . **David C. Kanter** was with us for only a year, and has never followed engineering. He has been in the shoe business for 40 years. Now comes a letter headed "A Dropout Returns To His Original Field." He has joined the Hydraulic Engineering Company in Cambridge as office manager. Dave was in Israel last May and visited Technion some three weeks after a beautiful new building had been dedicated to Dr. Compton. . . . **Charles A. Thomas,** Monsanto's board chairman, has another high honor. He will be (or has been) presented with the Deeds-Kettering Memorial Award for 1964 "in recognition of his outstanding achievements in engineering and science."

There was a class luncheon in New York on Veteran's Day. Present were Walter Bagby, Will Blaisdell, Dick Lassiter, Nate Schooler, Howard Stevens and Paul Cardinal. . . . In the small world department, **Paul** and Lorene were having dinner in a Harrisburg restaurant when they discovered the **Lefty Walkers** (from Hingham, Mass.) seated a few tables away. And in the larger world department, the **Cardinals** now have 15 grandchildren—11 girls and 4 boys. . . . One of your classmates believes he has established some sort of a record. Brian Becker Lindsay was born to the **George L. Lindsays** of Erie, Pa., in March, 1963. Unless we hear to the contrary, that is, indeed, a record. George, by the way, has changed positions. For 20 years or so he was with the Skinner Engine Company. Now he is first vice-president of the Canadian Holiday Line, operating a passenger steamship. If you're interested in a holiday on inland waters, write to George. The company address is P. O. Box 88, Erie, Pa. . . . And so, on this alluring note of happy holidays to come, we bring this mid-winter column to a close.—**Henry B. Kane,** Secretary, M.I.T., Room E19-439, Cambridge, Mass. 02139.

'25

By the time you read this, the 40th Reunion will be but a few months away. If you have not already replied to one of our two general mailings, please make haste! Don't forget the 40th Reunion Gift, which is a matter of considerable importance to your working committees.

Some members of the Class have made the news rather recently. A few weeks ago an article appeared in a publication known as the Tucson Progress. It was headlined, "Ambassadors of the Southwest, Par Excellence!" The article is quoted, in part, as follows: "It would be hard to find two more vibrant people than **Weldon** and Phyllis **Heald.** Maybe that's because they are doing just exactly what they want to do and earn their living thereby! Tucsonans can be grateful that these two reside right here in Tucson, for Mr. and Mrs. Heald are writers and so much of their writing is about not only Tucson, but all of Arizona. They are unofficial ambassadors of the Southwest and their writings appear frequently in such publications as the Arizona Highways, Desert Magazine, Western Ways, Pacific Discovery, Point West and Arizona Days and Ways. Before embarking on literary careers, Mr. and Mrs. Heald had a variety of adventures. Mr. Heald is a graduate of Massachusetts Tech and for 20 years was an architect. War interrupted and he spent four years in the Quartermaster Corps, after which they returned to California." Back around 1947, the Healds bought the Flying "R" Ranch in Arizona and have been ranching ever since. Speaking further of their literary careers, the article noted that they taught as a team for 10 summers at the Southwest Writers Conference at Flagstaff and this year Phyllis is president of the Arizona Press Women. Weldon is a great conservationist and for the past four years has been a consultant to Secretary of the Interior, Stewart Udall.

The December 1964 issue of The Reflector has a short article by **Arnold Bailey,** currently staff scientist at Mitre Corporation. The article is entitled, "Suggestions for Protecting Communications Equipment and Systems from Nuclear EMP and Transient Lightning Effects." As a reminder, Arnold was a member of the technical staff at Bell Laboratories from 1925 to 1947, director of research at Northeastern Engineering, Inc., and a staff member at M.I.T.'s Lincoln Laboratory before joining the Mitre Corporation. He holds eight patents on antenna and modulation devices and methods and is the author of a book entitled, "TV and Other Receiving Antennas." . . . An interesting article appeared in the November, 1964, issue of Fortune magazine, giving a further insight into **Jim McDonnell's** outstanding operation. . . . Finally, word has recently reached us of

the death of **George W. Furbush** on November 1, 1962. No details are available. —**F. L. Foster,** Secretary, Room E19-702, M.I.T., Cambridge 39, Mass.

'26

It's Monday evening and class notes did not get written at Pigeon Cove yesterday. Our St. Bernard, **Heidi, is not** curled up at my feet. I just put her to bed in the basement. What is more, the notes are due tomorrow. Who saved the day? Why none other than old **Bill Millar.** You are therefore going to hear from Patagonia, Ariz., instead of Pigeon Cove. Bill's letterhead, in addition to having the words consulting geologist, has a tiny piece of rock glued to it which I could duplicate by applying a bit of gold leaf to a little piece of Pigeon Cove granite but Patagonia rock must have the gold built in. Will everyone in the class please read the first paragraph of Bill's letter carefully! "Dear George: Resolved last year to be at least a once-a-yearer as regards a note to you, and so here we go. If all the class would do likewise, we'd all know what everyone else was doing—just like here in Patagonia! Fact is, I think class notes get read first and the reason for your occasional thin file on the subject is plain lethargy on the part of should-be writers. And that includes me, except for the above noted resolve which somehow has lasted out the year, unlike my New Year's collection of resolutions. Nothing new to report in Patagonia as I have been traveling again, this time for a mineral work-out in the Philippines. First visit there, and I enjoyed my fairly extensive travels in and around the island of Luzon. As reported to the local armchair explorers in Rotary, I brought back three particular impressions which will last longest: (1) It was a nation really in mourning when General MacArthur died. He is a national hero who will not be forgotten quickly, as is our U.S. custom with heroes. (2) The population explosion is visible along every highway on the Islands. Kids, kids and kids, all seemingly between 2 and 10! Most of them still get something to eat, but how will it be when they grow up and start working on the population figures? At present a third of the rice requirements (no. 1 food item) has to be imported. I suggest the population control people have a job waiting in the Philippines, and for a fine people, too. (3) There are more jeeps in Manila than any other city in the world. I counted 1,000 in five minutes at a busy intersection. It started with wartime leftovers and expanded by imports from everywhere. The basic war jeep is all but hidden under a gaudy, locally, made bus body designed to seat 14, and the resulting equipage is called a 'jeepney.' Actually, each jeepney generally carries about 20 riders plus hangers-on, and you can go clean across town for 10 centavos (2½¢ US). Riding in jeepneys is the biggest single activity in Manila. Don't want to overdo my 1964 stint so I'll sign off with good wishes. Have you trained that monstrous dog as a deckhand yet? Sincerely, Bill". Thanks Bill—We hope that your 1965 resolutions carry on. Being a geologist you will be interested in knowing that the Harvard professor to whom we sold our Pigeon Cove house heads the Geology Department. We expect to learn from him something about the rocks on which we plan to build our new house.

Also to the rescue this month is one **Mark Greer.** "Dear George: "I'm midstream raising $200,000 for our Camp Reservation of our Boy Scouts Council to make fine young Americans. Some of them will surely go to M.I.T. Also working on our class gift. I'm planning on attending the 1926 Reunion in 1966. Hope the reunion will include classmates like me whose wives allow us to attend without them. Regards. Sincerely, Mark". . . . We note a couple of changes in address that must have significance of some kind behind them. **George W. Breck** is now located at P.O. Box 8433, Fort Lauderdale, Fla., and **Bradford P. Young** has moved from Philadelphia to 4826 East Waverly Street in Tucson, Ariz.—also significant. . . . From the same group of notices we regret to give you the following—**George Hannauer, Jr.** died in La Grange, Ill., on May 1, 1964. We have no details . . . Last, but not least, a clipping tells of the achievements of **Whit Ashbridge.** "In recognition of his having handled a 50 per cent greater work load with no substantial increase in personnel, Assistant Administrator for Construction Whitney Ashbridge, recently received a Presidential Citation from V.A. Administrator, John S. Gleason, Jr. The citation, signed by President Lyndon B. Johnson and Mr. Gleason, reads: 'In special recognition of an outstanding contribution to greater economy and improvement in government operations during the tenth anniversary year of the Federal Incentive Awards Program.'" We hope that the content of this clipping does not place the responsibility for Whit's recent serious bout with sciatica upon that 50 per cent greater work load. In any event, congratulations, Whit for the award. . . . Having had the class notes written for me this month, I'll close my 'thin' folder and hope that the kind of resolution Bill Millar made will start to spread. Meanwhile, cheerio until March.—**George W. Smith,** Secretary, E. I. duPont de Nemours and Co., Inc., 140 Federal Street, Boston, Mass.

'27

It is interesting to follow the safety activities of **Frank Crandell** over the past few years, as reflected by our files. A long-time employee of the Liberty Mutual Insurance Company, in 1950 he was in charge of their Loss Prevention Department and was awarded the Clemens Herschel prize by the Boston Society of Civil Engineers for an article on the effect of blasting on structures. The following year he was at work on a subaudible sound detector to detect rock falls by recording rock noises. Pursuing his safety interests, he was studying possible reductions in mill vibrations. By 1954, Deke was spending a lot of time on the "Car of Tomorrow," assisting automotive engineers in designing cars to minimize the increasing annual death and injury rates and reduce the high cost of repair work. In 1958, this had developed into the Cornell University-Liberty Mutual Safety Car, able to withstand a 50 m.p.h. crash into a stone wall with no harm to occupants. At this time Deke had been appointed chief engineer and assistant vice-president of Liberty. Now comes word, in the Boston Traveler, that Frank has been appointed to an advisory group to the National Academy of Sciences' committee on Supersonic Transport Sonic Boom, which has been formed at the request of President Johnson. Seems right in line with his capacities.

Professor **Henry G. Houghton,** Chairman of the Department of Meteorology at M.I.T., whose activities in the American Geophysical Union were recorded in these notes last month, has been appointed chairman of the American Meteorological Society's Scientific and Technological Activities Commission. . . . Dr. **Harold Edgerton's** many activities now include work on cinemicrophotography of the conjunctival circulation of the eye, in which high speed pictures illustrate something quite different from what appears at lower speeds. Flow is seen to be "microturbulent" without axial streaming. He has also been elected to membership in the National Academy of Sciences, and through this election, becomes a fellow of the American Geophysical Union.

Wes Meytrott, who has been in "Who's Who" for quite a few years, is also on my personal honor list, for having written to me of his recent activities. He says: "This particular note is sparked by the mention in the class notes of the possibility of holding our 40th Reunion at the Bald Peak Colony Club. This is a loud and affirmative vote from me to make reservations now. It's a delightful place. I know we'd have a delightful time. You may recall, I have been one of those regularly voting NO on the proposition of having the wives attend. Time changes all things! I'm now definitely in favor of having the distaff side join us. An item for the class notes if you want it. I have just been elected president of the board of managers of the Methodist Hospital of Brooklyn. It's a fine hospital and I have become more and more interested in its work. Takes a lot of time but it's worth it. I'll be 60 next February. Friends are kind enough to say I don't look it; anyway, I don't feel it." Looks like Wes has a good formula for staying young. His full-time job is as vice-president, Consolidated Edison Company of New York.

Sydney D. Berman, recipient of two meritorious civilian service awards, was given the Air Force's highest civilian honor, the Exceptional Civilian Service Award. It was based on his performance as technical adviser int he Pentagon-level Directorate of Aerospace Safety. Secretary of the Air Force Zuckert commended his contributions as being of "inesti-

mable value to the combat potential of the United States." Syd's civilian status at Norton AFB, Calif., is equivalent in the military structure to that of a major general. He is consulted on USAF weapon systems covering aerodynamic design, structural engineering, fire and explosion, and metallurgy. Syd has previously been chief of the technical division of the bureau of safety of the Civil Aeronautics Board. . . . In addition to disposing of his factory property at Nashua, N.H., **Glenn Jackson** is promoting the Cortez Motor Home in New England. This home-on-wheels, fully-mounted on a Clark chassis contains bedroom, kitchen, dinette and bath, and Glenn rents them for as little time as a weekend. . . . The class files are really building up. At present they occupy more than two two and one-half-foot file cabinet drawers—and are growing all the time.—**Joseph S. Harris,** Secretary, Masons Island, Mystic, Conn.

'28

Everybody in New York City undoubtedly read the story on **John Charles Leslie** in the Daily News of last September 8, but for the benefit of his other classmates we quote from "Only Human," by Sidney Fields. The heading of the article is "Wheelchair Executive." "The way John Charles Leslie sees it, no matter how badly disabled a man is, he's not handicapped if he looks at what he has left, not what he's lost. In 1950, when he was 45, polio immobilized his legs completely. He can just about move his hands. But from a wheelchair he helps run Pan American World Airways, an operation that carries 20,000 passengers over 375,000 miles every day. Leslie is a director, vice-president and assistant to Pan Am's chairman, Juan T. Trippe. He also looks after the airline's interests in the International Air Transport Association and the American Air Transport Association, and handles all landing rights and agreements with 50 foreign governments. 'It's like running a State Department,' said Leslie, silvery, soft-voiced, considerate. Away from his full and often frantic work he's a prime mover in the Community Service Society. He worked for a year on the National Committee on Health Care Insurance for the Aged. He enjoys his friends and family and finds time to read history and biography in vast quantities. In 1935 he set up the routes and developed the flight techniques that started the first commercial air service across the Pacific. In World War II he supervised the installations for the U. S. military Atlantic air routes and ran Pan Am's vast wartime operations to Europe and Africa. Before World War II, flying time of the old clipper ships was measured in days. What does Leslie see ahead? 'In about seven years we'll fly supersonic transports across the Atlantic in three hours and from the West Coast to Tokyo in five hours and 15 minutes. And just around the corner is the all weather landing system. Computers and radio beams will land the plane automatically.' He added with quiet excitement: 'I'll never get over being part of a world-wide carrier that competes with 92 other airlines and yet they all work together like one huge machine. That does more for peace and trade than anything I know.' Ironically, four years after he was hit with polio the Salk vaccine was declared a success. When it came he told himself he didn't have to run 100 yards in 10 seconds, that he was neither a pole vaulter nor a violinist. Didn't he feel any self-pity at all? 'I was too busy trying to get back to work,' he said. 'I had a family to support.' Six months later he returned to the job. What was the real force behind his will? 'My faith,' he said simply. 'I just knew I needed more resources than any one man has in himself.' "

We had a pleasant note from **Jim Donovan,** our loyal correspondent, early in December, in which he told us that members of Course X will be glad to hear from two long lost characters, Gus Colarusso, '29, and Mike Comperchio, '29. Jim stumbled on Gus in his own plant one day, while the latter was visiting the engineering department about a new piece of equipment. Gus apparently went with Kellogg after leaving school; and because his parents were getting along in years, he came back to New England and took a job with the Van Brode Milling Company in Clinton, Mass., where he is vice-president of research and development. Gus, in turn, reported that Mike Comperchio is now an inspector with the U. S. Corps of Engineers. . . . And talking about people who haven't been named in this column for lo these many years, we give you **Dave Mathoff.** We met Dave at a Boston Symphony concert early in December, and he told us that in April of this year he suffered a heart attack and was in the hospital five weeks. After recovering, he returned to his post as chief engineer of the Boston Building Department, but retired September 1. Like many men who retire, he allowed himself to be inveigled into more work than he has ever had before. He now represents M. J. Kessler and Sons, New York City architects, in all their projects in Massachusetts. At present Dave is supervisor for the architects on a large building on Tremont Street across from the Boston Common. This is costing over $12 million. He is also associated with **Abe Woolf** as a consultant.

A news release dated October 17 tells us that **Mieth Maeser** of Beverly, who retired from the United Shoe Machinery Corporation in August after 30 years of service, is now employed by the A. C. Lawrence Leather Company of Boston as a consultant on the physical properties of leather related to shoe factory performance. . . . And another news release, from the October 26 issue of Supermarket News, boasts that Professor **R. S. Harris** was to discuss nutrient science at the annual Food Forum of the Grocery Manufacturers of America at the Waldorf-Astoria in New York. . . . **Ralph Jope** recently told us that **Dave Donovan,** Course 1X, passed away last February. He had been living in Boston these many years. Many of us remember him as a member of the junior varsity crew and a member of Sigma Chi fraternity.—**Hermon S. Swartz,** Secretary, Construction Publishing Company, Inc., P. O. Box 255, Lexington, Mass. 02173.

'29

Replies from '29ers who heeded the advice to "Go West" certainly show that they have fared well in that area. In sunny California a good number of classmates found their niche. It was indeed a pleasure to hear from one of our coeds, Mrs. **Constance Sharp Sammis** of Newport Beach, Calif., presently associated with the Los Angeles City College as an instructor in English journalism and creative writing; she is also a columnist for the Christian Science Monitor. She wrote of her recent visit to M.I.T. where she discovered there were 49 women in the freshman class! . . . **John Cope** of El Cerrito, Vice-president of California Chemical Company, comments that he "would love to hear from any of the X-A practice school group of 1928-29." He has worked for Standard Oil Company of California for 33 years. . . . In Oakland, **Gerald Palmer** is manager of executive sales, Kaiser Aluminum and Chemical Corporation. . . . **Edward J. Partington** is an engineering specialist, Nortronics System Support Ordnance Division, a division of Northrop Corporation, in Garden Grove, and has quite a history of design and development work in the aviation industry. . . . **Peter Gnoocheff** is a draftsman with Carl Matson, Architect, in Los Angeles, having previously been employed as set designer for several motion picture studios. . . . **Sam Shaffer** is associated with the May Department Stores Company in Los Angeles where he is treasurer and vice-president. . . . In Piedmont, **John G. Howell** is principal engineer, Owens-Illinois, Pacific Coast Division. . . . **Joel M. Whitney** is power plant engineer, aircraft division, Douglas Aircraft Company in Long Beach. . . . **Richard Piez** of San Mateo is manager, western operation, Jabez Burns-Gump division, Blaw-Knox Company; Dick also sent us news of two other Californians, **Hugh Griswold** in San Francisco with Owens-Illinois and **Earle Ericksen** who lives in Burlinghame, working for the Post Office Department in San Francisco. . . . **Carlton Wood** of Santa Maria is senior development engineer, I.T.T. Kellogg, Communications Systems Division at Vandenberg AFB. . . . In San Francisco, **George William Burgess** is president of Fibreboard Paper Products Corporation and is active in the Sales and Marketing Executives Association and the American Association for the Advancement of Science. . . . **Robert Haskell,** Colonel U.S. Army Retired, lives in Santa Rosa, after a most impressive career in the military service and executive positions with V. P. Hall-Scott, Inc. and Ampress, S.A., on a foreign assignment.

From the Lone-Star State we heard from nine classmates. . . . **Dayton Wilde** from Houston wrote of his lifetime career

with Humble Oil Company from which he is to retire in 1965; he started in research and is presently engaged in administering the company's contributions program. . . . The oil business attracted **Thomas Moore** also, who is now doing limited consulting in Houston, having retired from Standard Oil Company after 33 years of service. . . . Another Houston resident is **William F. Jenkins** who is assistant purchasing agent of the Houston Lighting and Power Company. We find a most unusual hobby occupies his spare time—that is, raising trees from seeds which he searches for in the fall. Each spring he plants about 2,000 seeds in the hot house and later transplants seedlings in gallon buckets. Bill says his biggest problem is "getting rid of all the trees—free!" . . . A most enthusiastic biographical sketch was received from **Russ Clark** of Dallas, Texas, as he writes about his fantastic career in the aviation field which was inspired by Lindbergh's flight over the Atlantic. Russ is currently vice-president of Ling-Temco-Vought, Inc., and general manager of Vought Aeronautics Division. A long list of memberships in aeronautic associations and artive interest in M.I.T. clubs and the Educational Council is most admirable. Russ also added news of other '29ers, namely: **Henry Gibbons,** who works at L.T.O. Dallas as associate director of L.T.O Corporate Research; **Walter Burke,** who is vice-president and general manager of space craft at McDonnell in St. Louis; **Paul Baker,** who is technical manager at Republic Aviation, Long Island; and **Emerson Conlon,** who wrote Russ last from NASA Headquarters in Washington, D.C. Thanks, Russ, for all the news. . . . Also from Dallas, **Whitney Sexton** wrote of his career in pipeline construction and operation and is now general manager of the Toronto Pipe Line Company. . . . **Louis Southerland** responded from Austin, Texas, where he is a partner of Page, Southerland, Page, Architects and Engineers. We have further news that Louis represented M.I.T. at the inauguration of James Henry McCrocklin as fourth president at Southwest Texas State College on November 20. Mr. Southerland is a regional chairman of our class. . . . **John Courter** is now living in Austin, having retired from 35 years' association with the U.S. Bureau of Public Roads. John recently visited M.I.T. on a trip through New England and the Fair. . . . **Warren Spofford** is project engineer, design evaluation air conditioning department, General Electric Company, Tyler, Texas, with which he has been connected since graduation. . . . From Midland, Texas, we heard from **Edward Reigle,** who is owner and manager of Richmond Drilling Company and president of Farley Machine Works Company.

Harry Miller, a retired U.S. Army colonel, is now living in Phoenix, Ariz., and is advisor to the president of Paraguay, Department of State, director of operations mission, El Salvador. Also living in Phoenix is **James Coe,** who reports that he is now self-employed and recently completed a book, "Common Stocks for Investors and Traders." He is a former lecturer in engineering at Arizona State University and served with the Department of Defense as an electronic scientist for 30 years. . . . Another alumna has sent a nice reply from Salt Lake City, Utah, where **Ruth Mumford Smith** is a consultant with the State Department of Health, having devoted many years to the health service. In 1938 she received a master's degree at the University of Michigan in Health Education and is now training vocational nurses. . . . Ponca City, Okla., is the home of **Lloyd Vickery,** who is manager, central engineering department, Continental Oil Company, with which he has held many challenging positions through the years. He reports there are at least 30 younger M.I.T. men employed there also. . . . And, from Casper, Wyo., we have word from **George Crandall,** who is owner of Wyoming Wholesalers, wholesaler of sporting goods in Wyoming, Montana and parts of North Dakota, South Dakota, and Nebraska. This is a business which he undertook after retiring from the Army as a colonel. . . . Our sincere condolences to the families of **Russell Swain** of Morris Plains, N.J., who died December 12, 1963; and **Charles F. Nord,** who passed away December 3, 1964, in Louisiana, Mo., where he had been associated with the Nord Buffum Pearl Button Company. . . . My best regards to all.—**John P. Rich,** Secretary, 67 Berkeley Street, Nashua, N.H.

'30

Those of you with long memories may recall the item in the February, 1961, notes concerning **Bill Alling**'s move from engineering into religious work, and his ordination as a minister in 1953. It now appears that another of our classmates is making this very interesting transition. **Vince Thormin,** who has been working as an architect for Aluminium Laboratories, Ltd. in Montreal, writes as follows: "I am an elder of the Valois United Church. Last year I felt the call to be a full time minister of the Church, so I registered and attended night school at the United Theological College. I completed my first year while architecting for Aluminium Labs. This year I am doing the same. The course involves four years nights after which time I will retire from my architectural work and attend one year full time before ordination, if God is willing. The prayers of my classmates will help. So fellows, I'm at school again and strangely enough I find it not overly difficult, and it is fun, and above all I feel a wonderful sense of accomplishment." Vince has four children: Margaret, who is secretary to a patent lawyer; Terry, who works for Bailey Meters; Jean-Anne, who is a secretary at Sir George William University; and Beryl, who is in high school.

Bill Waite works for Du Pont's engineering department in Wilmington, Del., designing and building "chemical plants, research facilities, etc." He is thus one of the few members of the class who is still doing engineering work in the professional field they elected at M.I.T. To satisfy my curiosity after writing the foregoing sentence, I reviewed my records and using a fairly strict definition of engineering, could find only two other Course X men who fall in this category (**Bill Dickerman** and **George Gassett**). Bill's communication points with pride to his piscatorial prowess which can perhaps best be reported in his own words: "On June 21, 1964, at water depth of 90 feet, I caught a 15½ pound lake trout at Nelson Pond, Calais-Woodbury, Vt. It is the largest fish ever caught in that pond". Other anglers take note. Bill, like Vince, has four children: Joan, who is a registered nurse, now married with two children and living in San Rafael, Calif.; Richard, who graduated from Annapolis, has a nine-month-old daughter and is stationed in San Francisco; Bill, Jr., who is with a USAF mission in La Paz, Bolivia; and Barbara who is high school age.—**Gordon K. Lister,** Secretary, 530 Fifth Avenue, New York 36, New York; Assistant Secretaries: **Charles Abbott,** 26 Richard Road, Lexington 73, Mass.; **Louise Hall,** Box 6636, College Station, Durham, N.C.; **Ralph Peters,** 16 Whitestone Lane, Rochester 18, N.Y.

'31

A recent announcement tells that our class prexy, **Howie Richardson,** has entered the management consulting field. With his background and experience, he should soon be one of the most sought after consultants in the U.S.A. and elsewhere. . . . **Emilio Collado** still looks as hale and hearty as ever, although his work with Esso keeps him pretty much on the go. I ran into him recently at the London Airport. . . . **Dick C. Holihan** was in the news again when he was elected Michigan's 107th most excellent grand high priest of the Grand Chapter of Royal Arch Masons of the state. He is the fourth Flint Mason to achieve this honor. . . . It was with sorrow that we learned of the death of Dr. **George A. Catanzano,** of Nashua, N.H., on September 8. George was a practicing chiropractor, and leaves his wife Viviene F., and four sons: Tyrone D., George, Jr., Robert U., and David C. . . . Recent address changes include **John K. Jamieson,** Standard Oil Company, 30 Rockefeller Plaza, New York, N.Y. 10020, and **Alexander L. Pavlo,** 530-5th Avenue, New York, N.Y. 10036.—**Edwin S. Worden** Secretary, 35 Minute Man Hill, Westport, Conn.; **Gordon A. Speedie,** Assistant Secretary, 90 Falmouth Road, Arlington, Mass.

'32

Among the 16 metallurgists and materials scientists from the United States participating in the Latin-American Conference on Metalworking in Buenos Aires, Argentina, August 18, 1964, was our Dr. **F. Rolf Morral** of the Battelle Memorial Institute. While there as chairman of the ASM Committee on Inter-American Relations, Dr. Morral endeav-

ored to promote co-operation between ASM and its counterpart societies in South America. He sends a note that he also had a very pleasant visit with our classmate **Julio J. Gallese** and his family in Lima, Peru, and spoke to a meeting of the local M.I.T. Club in Buenos Aires. . . . Tech Talk for October 8 has a picture of M.I.T. Professor **John T. R. Nickerson** as "father of the bride." The bride was a graduate student in nutrition, Silloo Irani, from India. None of her family could come for the wedding so it was made an M.I.T. family celebration with her thesis advisor playing "Papa." . . . **Bill Barker** sends a note to say that a fine write-up on Wyandotte Chemical Company and **Bob Semple** appeared in the September 23 issue of Merrill-Lynch's Investor's Reader.

Alumni of M.I.T. living in Wellesley made a remarkable record of 96 percent participation in the 1964 Alumni Fund. Chairman of the committee for Wellesley was **James B. Smith.** He is vice-president of the Factory Mutual Research Corporation. It's not too late to make your contribution ot the 1965 Alumni Fund to raise our class's percentage participation (and the readership of The Review).—**Elwood W. Schafer,** Secretary, Room 10-318, M.I.T., Cambridge 39, Mass.

'33

I have a letter from one of the faithful(?), asking how I go about writing these notes. He tells me nothing about himself, so one may see that he asked a fine question, and pertinent, to wit: "How do these notes get written without personals from the class members?" I can and will tell the boys about the mechanics of note writing, '33 style. First, the Alumni Office sends monthly clippings from the press. These we quote, paraphrase, expand, or condense. Then occasionally we get a personal note from some classmate who hasn't heard he is joining the distinguished few who write. After the personals, all too often these days, we have to mention the passing of a classmate, and we end with the usual blurb about scholarship funds, class reunions, et al. That's all there is to it. . . . I have before me one of the nicest write-ups that has ever crossed this desk, written about a distinguished, not to say unique, classmate, Miss **Gertrude Ebbeson,** the only licensed lady architect in the State of Maine. She is a resident of, and practices in, Bangor, Maine. Gertrude is connected with the firm of Crowell, Lancaster, Higgins and Webster, of Six State Street, Bangor. She says: "A woman has to work harder than a man does at this same job. I have to go out on the jobs, to check progress, follow specs, aside from writing these same specs, I have to climb all over the site (she used to), making a check on location of pipes, etc., etc." She likes modern architecture, as well as period styling, but not attempts to combine the two. Another item catches my eye—where she deplores rushing the architect into presenting a hasty design. Anyone who has ever built anything can understand Gertrude's point. In passing, I would like to mention that Leona and I built a home in Florida, spent 15 months designing the house, and eight months building it. The design cost us no more, and we had only two percent extras, the contractor's Valhalla.

A clipping mentions **John R. Wiley,** who is at present director of the Port of New York Authority. John, it seems participated in a flight transportation seminar, and presented a paper entitled, "Airport Management, Operational Problems." John also had coffee, it says here. . . . Indirectly, we hear that **Charlie MacMillan,** Chief Engineer of the Bear Manufacturing Company, of Rock Island, Ill., was to be the representative of the Institute at the inauguration of Howard R. Bowen, as the fourteenth president of the University of Iowa, on December 5. This is an honor for our classmate. . . . In my own mail comes a circular from the M.I.T. Alumni Center in New York City. On November 30 three professors of chemical engineering at M.I.T. took over a panel discussion in order to try to answer these questions: (1) Can we provide enough water for the world population explosion? (2) Can economical demineralization of water be achieved? and (3) What is the impact on industry of these and other new M.I.T. chemical engineering developments? The answers to the first two had better be "yes," and the third who knows? Of prime interest to us as a class is that **Edwin R. Gilliland** is the head of the Department of Chemical Engineering. . . . **Morris Cohen** is also a member of the department. The other two men on the water program are also M.I.T. professors from the same department, but were graduated in other classes. I was genuinely sorry not to be able to attend this one, as I was in Chicago at that time. I went to the International Livestock Exposition and did not get to New York until December 2; at this time we were to find out through President **Ed Goodridge** if and when we have a regional meeting of the class in Chicago come spring: **Cal Mohr** please note.

We do have one or two personals. We have a bleat from San Antonio, Texas, from **Willie Harper,** who cries that I do not present the facts as given to me. Who ever told Harper that I had any intention of transcribing facts. As a policy let it be understood that facts will be presented as is, if they make better reading that way. If not, we reserve the right to make them into better reading, with the guarantee that no one will be the loser. I just cannot give Willie Harper any more space, as he is already way over his annual quota, even if we two are the only ones that have the story 100 per cent straight. . . . I was really right about **Bob Forbes.** That gleam in his eye was just what I thought. He did have his eye on that special girl, and after I wrote about it, he married her. Bob it turns out, is active in the local SPEBSQSA. . . . Say, friends, this suggests a new approach. All those who are interested in this barbershop quartet movement write the secretary at once. This is something non-professional which seems to get a lot of attention, and properly so. Those that I have heard are really tops. Bob Forbes says that the annual meeting of the international organization is to be held in Boston next June or July and he says that he will attend as part of a finalist group. Bob is a member of the Dixie Champions, crowned at Chattanooga in October, and all the regional champs will compete for the top honors come next summer. Also, he allows that he will call at the best little Angus farm for a session on the porch. Welcome in advance, Bob, and what will you have? Don't say a julep, as this drink does not conform with the surroundings, local sentiment and all. He put more in about 10 lines than he did in the whole three pages that I got before. The bride is Helen Love Roach of Hayesville, N.C. I will check with Beau on this if he ever writes again. He is our vice-president in the area.

We have a nice letter from **Horace MacKechnie** who brags first about being a grandfather. He is now automatically a member of the club. He says it is a bit funny to be married to a grandmother. Horace, at least you stayed out of trouble, which is more than I did. I tried to make my wife walk behind me, so folks would not see me walking with a grandmother, and to put it mildly, this effort got me no where whatever, except that I had to listen to a few of the facts of life, as sorted out by a grandmother. Well, it seemed like a good idea at the time. Horace is no longer with Sylvania, and has severed connections with R.C.A. Now he is working for Uncle Sam in the Department of Defense, the Value Engineering Services Office. This office is a "money saving outfit." His office is assigned to various and sundry projects (military electronics) with the avowed purpose of cutting costs way, way down. I discover that it might be best to quote Horace: "We are supposed to save the government 10 times our total expense (total office expense). I am not too clear on just how Horace and others working on this project effect all of these savings, so, if he will write again, and give me a bit more detail, I will be glad to suggest a campaign manager for him, just in case he decides to run for something. A money saver could, eventually, become popular. Horace seems to be gratified that the reports of his group go directly to Secretary of Defense McNamara, and, this is easy to understand. . . . Did you see the sign on the door of the local Gift Shoppe? It reads, "Wette Painte."

Far too belatedly, we hear of the passing of **Remi Beausejour,** almost three years ago. Our sincere sympathy goes to his loved ones. Remi passed away almost three years ago, and this is a late, late date for us to hear about it. Our system of communications must have bogged down. . . . A change of address form tells us that **Henry Kiley** has moved to New Jersey. One time Henry was a professor at the Institute, but no more, it appears. These address forms are about as brief as a form can be, so, Henry, you are up. Let us hear what gets you to New Jersey. . . . Do you chaps remember that smile of Henry's? I will defy anyone to figure out what he is thinking when he gives you that smile, and if memory serves as it should, I haven't seen that smile in 32

years, more or less. Please write, Henry.

A full week has elapsed since publicizing Kiley. It was spent in Chicago at the International Livestock Show, and in New York City visiting with Ed Goodridge. Ed says that the regional meeting of '33 men in Chicago come next May is very definitely in the planning stage, so the Chicago boys will please take notice. The meeting will be informal with no program or objective except visiting with one another. We hope most of you will bring your wives. . . . The Alumni Office change of address system helps a little occasionally. From the change of address system we find that **Preben Oldenburg** has returned from what appears to be years in Saudi Arabia. Now, Preben, old pal, here is your opportunity to send in the story of your years in Saudi Arabia. . . . And who is Edward Brewer? Research says that Mr. Brewer is not a classmate. Let me remind you fellows that I have the most complete and up-to-date address file of the class. Also, via the same source came notice that **Dick Valentine** has moved from one home to another, in West Hartford, Conn. I note, the first time for me, that Dick is doctor Dick, no less. Now there is another chap who really owes me a line, as we were fellow Clevelanders for a short time, before Dick got talked into leaving the best location in the nation. In case some of you did not know Dick, he was voted one of the handsomest men in those hallowed halls at the Institute and six years ago, he was still right up there, and showed little sign of wear and tear.

As I write, a timely letter has gone out to you all, timed for the year's end. Its title is "The Robert M. Kimball Scholarship Fund, Class of 1933." Let me assure you all that this fund is going over, and no fooling, so why don't all you chaps get your names on the list, for posterity, even though it is only for a five, or ten, or twenty or fifty or up, just so that we will have a larger, and growing larger still percentage representation. We officers realize that some of us are not in top condition, financially, but surely everyone can find one small donation and although we might list the name of the men who made contributions we never will list amounts. Only **Jim Turner** and **Lou Flanders** will ever know the amount given by anyone. The Alumni Association guards this phase of its business with its very life, and no one gets a look, not even Goodridge and yours truly, and we do not wish to either.—**Warren J. Henderson,** Secretary, Fort Rock Farm, Exeter, N.H.

'34

In December, **George R. Struck** was elected an assistant vice-president of Eastman Kodak. George joined the company's sales department in 1939 and has specialized in industrial X-rays, serving as technical representative for the eastern states. . . . **Herb McKeague** was named general manager in October of Motor Wheel Corporation's new brake drum plant in Ypsilanti, Mich. The newspaper story quotes Herb as planning to move his family to Ypsilanti. . . . **Henry Mertens** was recently elected a vice-president of the Central Maine Power Company, which he joined upon graduation from M.I.T. 30 years ago. . . . Dr. **Nathan Goodman,** Chairman of the **Dental Staff** of the Parker Hill Medical Center and the New England Hospital, recently visited Jerusalem to help dedicate a new dental school.

Del Keily did an outstanding job on the Reunion Committee by his skillful handling of all the room assignments but then was conspicuous by his absence on the big weekend. I saw Del and Gertrude at the Earth Sciences Building dedication. Del is associate professor of meteorology and for the past three years has acted as chairman of the Building Committee for the Earth Science Building; he was ably assisted in this task by **Henry Morss, Jr.,** who is now at M.I.T. as administrative assistant in the Geology Department. Both Del and Henry have offices high up overlooking the Charles River Basin—Del on the 17th floor and Henry on the 9th. After Del recovered from the bug which put him to bed for the reunion weekend and kept him there for several weeks, he took off on a professional and pleasure trip for several months to Europe, Africa and the Middle East. The purpose of the trip was to study the Somali current off the East Coast of Africa during the monsoon season. His trip included a week of research on the problem at the Oceanographic Institute in Surrey, England; two days of further study at the Royal University in Nairobi, the capital of Kenya; three weeks making measurements aboard the Royal Research Ship "Discovery" between Mombasa, Kenya and Aden; about one week in Aden to finish up the business part of the trip and then several days with **Hank** and Nicole **Backenstoss** in Beirut where **Del says he was** royally entertained by our former class president and his charming wife. He visited the Temple of Jupiter, the City of Heliopolis and many of the other sights. Del then stopped off for a week at Palma, Majorca to "rest up" and return to Cambridge.

One change which has been called to our attention pertaining to **Charlie Parker's** excellent notes on our 30th Reunion—the drawing of the numbers for the gift awards, was handled by **Fred** and **Lee Barrett's 13-year-old daughter, Phyllis.** . . . A recent note and phone call from **Jim Eder** advises that **Charlie Parker** became a grandfather in July. Charlie runs one of the country's most important trade associations, the American Iron and Steel Institute in New York City.

A letter from **Len Shapiro** may be the shape of things to come for some of us. "Last month, after 13 years in Marblehead, while our youngsters matured into collegians who come home only twice a year, we decided to sell the eight-room house, and move into town. So here we are, only about a mile from the old alma mater, in a three and one-half-room apartment. Already, the snow shovels, a lawn mower, and gardening equipment are tools of the long-forgotten past, and I no longer have that 45-minute drive to work and back. We hope to be settled down soon, and will be glad to have any of the gang call up when they are in town (UN 8-8312) 295 Harvard Street, Cambridge. Latest on the younger generation is that Joel is on a teaching fellowship at University of Michigan, teaching calculus and working for his Ph.D. in math. Marjorie is in her fourth year as an art major at Pratt Institute, Brooklyn, N.Y."

We have an interesting letter from **Sam Groves,** currently vice-president of the Alumni Association. He is president of United-Carr Fastener, Inc., which he says "is a company that operates a number of factories and sales offices in the United States and also in England, Australia, and Canada. Since we do not make any single product, each of these factories pretty much stands on its own feet. We roughly deal in the same kinds of raw material and serve the same industries, but it is there the similarity ends. It, therefore, becomes necessary for those associated with our senior officer management group to do a great deal of traveling because only by first hand knowledge of the factories and the individuals who run them can we be aware of what is going on. This has led me into a number of places over the years and during 1964 I have been to England and the continent twice and Australia once, to say nothing of repeated trips throughout the United States and Canada. This is all interesting, stimulating and pleasant. My wife and I live in Wellesley Hills and when we get a chance we go to our cabin in southern New Hampshire and do a little fishing or bird shooting. It is also possible to sneak in a game of golf when nobody is looking. I have recently become a director of the National Association of Manufacturers and look forward to serving in this position with some interest because they deal with problems on a national basis and you meet people from all over the country."

John Borger, Chief Engineer of Pan American Airlines, authored an article in the September, 1964 issue of Aeronautics and Astronautics on "What's an Economic Supersonic Transport." He also was a visiting lecturer at the Institute in October on "Airline Design Requirements for Transport Aircraft—Today and Tomorrow." . . . A recent visit to **Carl** and Muriel **Wilson** finds the falcon's rest, given to Carl at the 30th by our outgoing president, Hank Backenstoss, occupying a position of honor in their living room. Not far away is a shining new sailing trophy attesting to Carl's summer skills. **Carl is currently regatta** chairman of the Webster Lake Sailing Association. . . . Another sailing enthusiast in the class, **Bud Snyder,** has recently retired from the Air Force and is studying for his doctorate at Stevens Institute of Technology. Bud and Scotty Snyder make their home in Summit, N.J. —**Norman B. Krim,** Secretary, 15 Fox Lane, Newton Center 59, Mass. Co-Secretaries: **Kendrick H. Lippit, 3782 Putter** Drive, Chula Vista, Calif.; **Charles M. Parker, 3 William Street, Norwalk,** Conn.; **W. Olmstead Wright,** 1003 Howard Street, Wheaton, Ill.

'35

Brad Bradner sent along the following announcement made November 29: "Mr. and Mrs. John Alexander Bradner, 22649 Westchester Road, Shaker Heights, Ohio, have announced the engagement of their daughter, Joan Alexander Bradner to Clarence W. Malick, son of Mr. and Mrs. Walter O. Malick of Stevens Point, Wis. Announcement was made Sunday to the families and a few close friends at a brunch at Acacia Country Club. Miss Bradner was graduated from Laurel School and is a senior at Boston University. Her fiance was graduated from Massachusetts Institute of Technology. . . . A late June wedding is planned." Brad added that Clarence W. Malick is M.I.T. '64, B.S.C. in mechanical engineering and "a wonderful youngster with whom we're delighted." Congratulations and best wishes to all concerned. The "late June" means that we should see you beforehand at our 30th on June 11-13.

Sid Grazi wrote from Denver: "It is naturally with some reluctance that I now pass the President's Cup to a new winner. However, it is with sincere pleasure that I offer my congratulations to **Art Marquardt** for having turned in some excellent rounds. It's a consolation to know I lost my match to the new champion. Congratulations, Art. Try to keep the cup a little longer than I did and don't let Leo get to you next season. Hope we get an opportunity to play together head-on in the near future. Leo, I have carefully packed the cup and am sending it out today by air. I hope the expense of engraving is not creating too much of a financial burden on you. Fortunately, I am able to afford the postage to return the cup this year. However, if I get my hands on it again, I'll try to keep it. You know the old adage, If you play poor golf, you have no business playing, and if you play real good golf, you have no business. Next time I get that cup, I will not be able to afford the postage to return it. Hope to see all of you next June at our 30th and hope we can get some golf in together at that time." Second the motion—with apologies to all non-golfers.

It is with deep sorrow that I pass along to you the news of the death last November of Scott Smith, 19-year-old son of **Prescott Smith.** He was an Andover graduate and in his second year at Tufts.

News from hither and yon: twelve members of the Class Steering Committee had a dinner meeting to set reunion plans which you will have heard in detail from **Bob Forster,** Reunion Chairman. His son Robert D. Forster is marrying Sharon Frank of Williamsport, Pa., on December 27 after he returns from the Mediterranen with the Navy. . . . **Phoenix Dangel** has one son a senior at M.I.T.; the other is now taking graduate work at Stanford after getting his bachelor's degree from M.I.T. last June. . . . Fathers of 30 children were among the 12 at the Steering Committee meeting, plus one grandfather, **Bob Anderson.** . . . **Bill Barker** is reported now working in Fitchburg having left Ludlow Manufacturing in October. . . . **Randy Antonsen,** Class Treasurer, reports a balance of $396 in the treasury. He is down to 41 strokes for 9 holes and will be in the class tourney next year. (No connection implied between these two statements!) . . . With more apologies to Pres Smith who says we have too much golf news in the notes, **Andy Andreoli** belongs to the Walpole Country Club and will enter the class tourney next year, too. . . . Bob Forster is Alumni Day Luncheon Chairman. . . . **Tom Morrow** was one of the speakers at Michigan Tech's dedication of a new building. Tom is a vice-president of Chrysler.—**Allan Q. Mowatt,** Secretary, 61 Beaumont Avenue, Newtonville 60, Mass.; Regional Secretaries: **Edward C. Edgar,** Kerry Lane, Chappaqua, N. Y.; **Hal L. Bemis,** 510 Avonwood Road, Haverford, Pa.; **Edward J. Collins,** 904 Merchandise Mart, Chicago 54, Ill.; and **Gerald C. Rich,** 105 Pasatiempo Drive, Santa Cruz, Calif.

'36

A letter from **L. G.** (Pete) **Peterson** provides news of the Schenectady contingent. He writes: "At the present time, there are three of us from '36 located in Schenectady, all working for General Electric. **Norm Willcox** has been back in town for several years, working first in the Manufacturing Laboratory and most recently on manufacturing automation projects. These assignments take him around the company and he spends most of his time out of town. Norm has been with G. E. since graduation and at several different locations. . . . **Len Wuosmaa** is a design engineer with the Large Generator and Motor Department. Most recently he has been working on new design concepts and innovations for a group of very large hydroelectric generators to be installed on the Columbia River in Washington. He, too, has been with G. E. since he left school. . . . I am still in financial work and associated with the power tube portion of the Tube Department. My older boy is a senior this year at Lehigh University and is considering graduate school. The younger boy started at Lehigh this past September and is enrolled in the College of Business Administration. We were quite interested and surprised to learn that his roommate is the son of Joe Heal '37. Our daughter is 12 and active in Girl Scouts which has resulted in my wife being a troop leader, which takes about 130 per cent of her spare time. We have become interested in boating and for the past few summers this has been our warm weather hobby. Schenectady is a good location for this, being near two rivers and several lakes, including Lake George where we have spent some time the past couple of years."

The Investment Dealers' Digest for October carried an article by **Hank Lippitt** entitled "Should Utility Commissions Manage or Regulate?"—His answer: regulate but not manage. . . . **Dorian Shainin** addressed the Salem, Mass., Chapter of the Production and Inventory Control Society on "The Pursuit of Facts"—a layman's introduction to statistical analysis. . . . The Alumni Register reports several changes of address some of which represent radical moves. I'll try to find out more. **Walter Bain** is now at Winding Drive, Cherry Hill, N.J. 08034; . . . **John Rowan** is in the Town of Mt. Royal, Quebec, at 163 Glengarry Avenue; . . . **Donald Spencer** has moved from Princeton, N.J., to Portola Valley, Calif. (4123 Alpine Road). . . . **Bill Budd**'s new address is 641 Kings Road, Yardley, Pa. 19068. . . . **William H. Metten,** 30 Walnut Park, Roxbury, Mass. 02119. . . . and finally, **Walt Squire**'s new address is Hedgerows-Tranmore Close, Lymington, Hants, England, quite a move from Madison, N.J.—**Alice H. Kimball,** Secretary, 20 Everett Avenue, Winchester, Massachusetts 01890.

'37

Bob Benson, Vice-president of the Equitable Life Assurance Society of the United States, has just written an article on "Regulation and Growth of the Natural Gas Industry" which appears in the Investment Dealer's Digest. Upon graduation, Bob spent two years as a student engineer with Consolidated Edison of New York and then attended the Graduate School of Business Administration at Harvard University to earn a M.B.A. degree in public utility management. His next post was with the Long Island Lighting Company as an engineer in the system planning department. In 1942 he entered military service and was assigned to the Office of the Commanding General, Army Service Forces. At the end of the war he held the rank of major. Benson joined Equitable in 1946 as an analyst in the securities investment department and in 1949 he was named public utility engineer. He was appointed manager of the public utility securities division in 1953, elected second vice-president in 1956, and vice-president in 1960. Bob, a member of the American Gas Association, has presented papers before meetings of that body, before various public utility commissioners' meetings and utility analysts groups, as well as at the Irving Trust Company utility seminars. He is a trustee of the Dime Savings Bank of Brooklyn; president and trustee of the Y.W.C.A. retirement plans, and secretary-treasurer and director of Brooklyn Garden Apartments, Inc.

Mort Nickerson has also written an article entitled, "The Expert Technical Witness on Trial" which was published in the American Bar Association Journal. Mort received his Ph.D. in 1940 from M.I.T. He has devoted himself almost exclusively to research and development in the field of plastics, and since 1958 he has been a senior member of the staff of the Research and Development Division of Arthur D. Little, Inc., Cambridge, Mass. . . . **Sidney Sussman,** for the past four

years technical director of Water Service Laboratories, Inc., New York City, was one of the principle speakers on the program of the 27th Annual Educational Conference sponsored by the Refrigeration Service Engineers Society. A graduate of Polytechnic Institute of Brooklyn, he earned his doctor's degree at M.I.T. He has been associated with the Water Service Laboratories for the past 15 years. . . . Your secretary received a card from **Jim Ames,** who is staff member at the Lincoln Laboratory, Lexington, Mass.—**Robert H. Thorson,** Secretary, 506 Riverside Avenue, Medford, Mass.; **S. Curtis Powell,** Assistant Secretary, Room 5-325, M.I.T. Cambridge, Mass.; **Jerome Salny,** Assistant Secretary, Egbert Hill, Morristown, N.J.

'39

In the line of "old business," referring back to our 25th Reunion, **Ernie Kaswell** should be accorded the appreciation of the entire class for his work as class treasurer, including the hours of painstaking work involved in handling the financial details of the reunion. These comments are prompted by a year-end preliminary report, complete except for some minor details. Ernie's report shows reunion income of $13,804 and expenses of $14,121, with the small operating loss of $317 being drawn from the class dues account. Based upon the experience of recent 25 year classes, the budget was $15,300, and the close tally of the final figures shows that all on the reunion committee did an excellent job in adhering to the overall plan. . . . Incidentally, for those of you who haven't kept up with Ernie's activities via the reunion or these class notes, he is president of Fabric Research Laboratories, Inc., Dedham, Mass. F.R.L.'s work involves research, development, and consultation in the fields of fibrous, organic, and related materials. . . . **John N. Hobstetter,** X, Professor of Metallurgical Engineering at the University of Pennsylvania, is the subject of a fine write-up in the October, 1964, issue of the Delaware Valley Announcer, an excellent regional monthly devoted to industry, science, and technology. John has been appointed director of Penn's just-completed Laboratory for Research in the Structure of Matter. The D.V.A. article devotes sixteen two-color pages to John's handsome multi-million dollar facility on the Penn campus. And for a biographical sketch, John graduated in 1939, then received his doctor of science from Harvard in 1946, teaching there until 1952, at which time he joined the technical staff of Bell Telephone. He became a member of the Penn faculty in 1958 as a professor of metallurgical engineering with a special interest in semiconductors.

Dr. **Edward M. Brooks,** XVI-Grad, nationally known meteorologist and weather expert, has been appointed to the staff of the physics research division of Geophysics Corporation of America, and located at Bedford, Mass. He is responsible there for broad programs in earth, satellite, and planetary meteorology. Dr. Brooks received his B.A. degree (cum laude) in mathematics from Harvard in 1937, his master's in meterology from M.I.T. in 1939, and his Ph.D. also from M.I.T., in 1945. From 1942 to 1946 he was an instructor and research associate in meteorology at M.I.T., and then served for 15 years as professor of science at the Institute of Technology, St. Louis, Mo. Subsequently Dr. Brooks has held meteorological positions with Allied Research Associates, Woods Hole Oceanographic Institution, and Pan American Airways. He is the author of more than 85 published technical reports and papers, including 20 different chapters on weather and meteorological subjects for several encyclopedias. . . . **Norman H. Taylor, VI,** has joined Control Data as special technical advisor to the president. Formerly he was vice-president of Itek Corporation, Waltham, and earlier was associate head of the Lincoln Laboratory Computer Division at M.I.T.—**Oswald Stewart,** Secretary, 3395 Green Meadow Circle, Bethlehem, Pa.

'40

Start to make plans for our 25th Reunion which will take place on campus at Tech on June 12-14, 1965. The Reunion Booklet is shaping up and you will have received further word about it by the time this column is published. We are well on the way to meeting our goal of $250,000 as a class gift. There has been at least one very substantial gift by a classmate and the company with which he is associated. . . . By now the Class has heard that **Ieoh M. Pei** was chosen as architect for the John F. Kennedy Library. Well known for numerous projects, Mr. Pei was architect for M.I.T.'s Green Center.

Brad Dewey, Jr. has been promoted to senior vice-president of the chemical group of W. R. Grace and Company. Brad was previously head of the Cryovac Division, makers of all those shrinkable bags which protected your Thanksgiving and Christmas turkeys. . . . **Herb Hollomon** gave a University Lecture on "Science and Engineering in the Great Society" at Tufts on October 28, 1964. . . . **Don Stookey** is the author of an article on Photochromic Glass in Data Systems Design for September, 1964.—**Alvin Guttag,** Secretary, Cushman, Darby & Cushman, American Security Building, Washington 5, D.C.; **Samuel A. Goldblith,** Assistant Secretary, Department of Food Technology, M.I.T., Cambridge, Mass.

'41

Dr. **Rogers B. Finch,** associate dean, Hartford Graduate Center, Rensselaer Polytechnic Institute, was guest speaker recently at a meeting of the Woman's Society for Christian Service of the Wesley Memorial Church, Ellington Road, East Hartford, Conn. Rog spoke about the Peace Corps. Rog received his doctorate in high polymer mechanics in 1950. He is listed in American Men of Science, and his long list of honors include a fellowship in the British Textile Institute. He has been a consultant on science and engineering education to the Overseas Educational Service since 1963. . . . **Joseph G. Gavin, Jr.** now vice-president of Grumman Aircraft Engineering Corporation, was recently honored by the Alumni Association of the Boston Latin School, of which he is a 1937 graduate, as "Man of the Year." He was awarded the tribute at a Boston Latin School Alumni Association dinner held at the Harvard Club. . . . **Howard J. Samuels** has been named chairman of a new organization entitled "The American Histadrut Cultural Exchange Institute" whose object is that of fostering an exchange of information and ideas by American and Israeli intellectuals. Howard said that the Institute plans conferences, an exchange of lecturers, and a New York library and archives.

D. Reid Weedon, Jr. was recently elected president of the Cambridge Chamber of Commerce. His term of office commenced as of October 1, 1964. He is a senior vice-president of Arthur D. Little, Inc., where he is in charge of business development in this country and abroad. Besides his degree in general engineering from M.I.T. in '41, he has done graduate work in the textile field, and attended the Harvard Business School's Advanced Management Program. During World War II he was a lieutenant commander in the U.S. Navy. He is a past-President of the M.I.T. Alumni Association, and is a member of the Corporation of M.I.T. He is president of Phi Beta Epsilon, a local M.I.T. fraternity. He served on the Chamber's National Affairs Committee for several years. Last year he was vice-president of the Chamber. . . . **David S. Weddell,** Sc.D., chemical engineering, has been appointed manager of a newly created project evaluation department of Monsanto Company's International Division. He had formerly been serving as director of its development department. . . . You will remember that in recent editions of this column, we have mentioned names of classmates who have progeny now attending M.I.T. An additional such classmate has come to light, namely **Bob Haslam** whose son, Robert Haslam, 3d, is now attending M.I.T. as the third member of the family to so attend M.I.T. Bob's father was in the Class of '11. . . . Dr. **Frank K. Pittman** has recently received the Atomic Energy Commission's Distinguished Service Award for his outstanding contribution in developing the commission's programs during the past 16 years. The award was made at the commission's headquarters in Germantown, Md. It is the highest recognition the A.E.C. can bestow on its employees. Dr. Pittman was a director of the Division of Reactor Development. The award consists of a gold medal, certification and a citation. The citation notes that Dr. Pittman's "foresight and outstanding technical and managerial leadership have resulted in not only unique civilian and military applications of nuclear energy, but also in developing the

technology on which the private nuclear power industry of the nation will build for years to come." He was appointed director of the Division of Reactor Development on October 28, 1958. At the time of his appointment he was director of the Office of Industrial Development and had also been serving as acting director of the Division of Reactor Development. He had been associated with the U.S. atomic energy program for four years at Los Alamos Scientific Laboratory, in charge of plutonium production when he joined the staff of the A.E.C. in Washington in 1948. He served successively as chief of the Feed Materials Branch, Assistant Director for Operations, and Deputy Director of the Division of Production. He was born in Sacramento, Calif., and was a member of the M.I.T. faculty from 1940-1943. He was a chemist for Corhart Refractories, Louisville, Ky., in 1943 and has resigned from the A.E.C. as of last November.

Martin Mann was made president of the National Association of Science Writers at its meeting held in the Hurricane Room of the Queen Elizabeth Hotel, Montreal, Canada last December. Martin formerly was associated with Popular Science and is now senior science editor at the Thomas Y. Crowell Company where he straightens out the prose of scientists who can't write and the facts of writers who don't know science. He was born in upstate New York and raised in Dover, N. J. He lives in Madison with his wife Eleanor and their three children Betty, Dwight and Bobby. . . . Dr. **William H. Cherry,** who for the past two years has been working on superconductivity, is a recipient of the Levy Medal of the Franklin Institute for a paper on the induction accelerator. After M.I.T. he received his Ph.D. degree from Princeton University in 1958. He joined the research staff of the RCA Manufacturing Company at Harrison, N.J., in August 1941, and transferred to RCA Laboratories in Princeton the following year. Since that time, he has studied dielectric properties of gas discharge plasma at microwave frequencies, inverted (external cathode) cavity magnetrons, the theory of the injection process and the nature of the electron orbits, the application of colorimetry and multiplex to color television, and the process of emission of slow positrons from solid surfaces. He is a member of Sigma Xi and of the American Physical Society. . . . **William Hooper** has been made one of the junior members of the staff of the Office for Science and Technology at the White House in Washington, D. C. Bill works exclusively on scientific and technical manpower. One of his main concerns right now is gathering statistics on the scientific and technical manpower situation in the country which will provide a proper foundation upon which to build national policy in this area. Bill is a graduate of M.I.T.'s School of Industrial Management.

John E. Bone has been made manager of the 'Nuclear Ship Savannah' project, the world's first nuclear powered merchant ship which recently made news when it visited South Boston Naval Annex. It is a ship that needs refueling only once every 3½ years and follows in the wake of its namesake the 'S.S. Savannah' of 145 years ago which in 1819 was the first vessel using steam on a transatlantic crossing. It took 29 days from Savannah, Ga., to Liverpool, England. The 'N.S. Savannah,' has become the first merchant ship to cross the Atlantic using nuclear energy, taking 10 days from New York to Bremerhaven, Germany with its 22,000 ton cargo-passenger. John was formerly a deck leader on the staff of the outfitting superintendent at Fore River Shipyard from 1941 to 1943. His first association with the Savannah began in 1958 when he was among a group of marine engineers invited to participate in a two-year training program for Savannah engineers at Lynchburg, Va.—**Walter J. Kreske,** Secretary, 53 State Street, Boston, Mass.; **Henry Avery,** Assistant Secretary, 169 Mohawk Drive, Pittsburgh, Pa.; **Everett R. Ackerson,** Assistant Secretary, 16 Vernon Street, South Braintree, Mass.

'43

Four hundred thousand dollars is the goal our class has set as our 25th Reunion gift to M.I.T. Arrived at after careful interpretation of past giving and an analysis of expected increased gifts during the next four years, it represents the total of all giving to M.I.T. during the five year period ending with the 25th Reunion. . . . Reunion gift chairman **Edmund R. (Ned) Swanberg** told us recently that in organizing the city and area committees the enthusiasm and eagerness of our classmates to participate was unparallelled in his fund raising experience. Ned has suggested the phrase "four by four" as a pattern to follow, on the theory that if each classmate were to give roughly four times as much each year in the next four years as he has in the past, we will reach our goal. . . . We're a great class—friendly, fun-loving and full of accomplishment. Here is our opportunity to demonstrate what M.I.T. has meant to us in our careers, friendships and as citizens, to share in the responsibility for tomorrow's leaders, and to invest in an institution that is at the pinnacle of higher education. Let's go, Forty-three!—**Richard M. Feingold,** Secretary, 266 Pearl Street, Hartford, Conn. 06103

'46

Peter N. Kyros was active in the recent election campaign. He is first district chairman of the Democratic Party of Maine. Pete graduated from Harvard Law School, is a former attorney for the Maine Public Utilities Commission, is a member of the American Bar Association and is in general law practice in Portland, Maine. . . . **John W.** and Nancy **Taylor's** Christmas card raises the Bermuda reunion issue again. John reports that Bob Nelson, Dave Moyer, Jerry Gumenick (and especially their wives) are interested in promoting Bermuda for our 20th Reunion in 1967. They indicate no enthusiasm for another trip to Cape Cod. It is still a little early to firm up reunion plans, but perhaps not too early to mount a campaign to suggest the reunion locale. If there are others in our vast reading audience who would like to go on record as to their reunion desires I shall be glad to serve as an information collection agency (send your letter to my address given below and don't forget to include information about you and your family which can be used in these notes) and I will pass your suggestions along to **C. S. Lyon.**

To prove that our classmates are on the move we have the following new addresses to report. **David Lee,** 140 West 43rd Street, San Bernardino, Calif.; **Alexander W. McEwan,** P.O. Box 5227, Clinton, N.J.; **John M. Dudley,** Colby College, Physics Department, Waterville, Maine; **Stanley Ruttenberg,** 365 South 43rd Street, Boulder, Colo.; **Marshall J. Corbett,** 43 Harbor Park Drive, Centerport, N.Y.; **Robert Cuccioli,** Blauvelt Engineering Company, 79 Madison Ave., N.Y.; **Gilbert B. Devey,** 11605 Magruder Lane, Rockville, Md.; **Ray H. Zarmer,** 3016 Burn Brae Road, Roslyn, Pa.; **Thaddeus A. Hawkes,** 12 Rue Lacretelle, Paris 15, France; **Edward H. Cumpston, Jr.,** 11 Bacon Court, Bronxville, N.Y.; **Arthur N. Verrier,** 113 Summerset Lane, Holcombe Brook, Nu Bury, Lancashire, England; **Addison F. Schade,** Apple Street, Essex, Mass.; and **Lawrence E. Nelson,** 231 Post Oak Road, Charlotte, N.C. . . . That, unfortunately, ends our communications for the month. If you feel as badly about the brevity of it as I do, perhaps you will drop a newsy line.—**John A. Maynard,** Secretary, 25 Pheasant Lane, North Oaks, St. Paul, Minn. 55110.

'48

It is with regret that we must announce the passing of **F. Patterson Spencer** of Wayzata, Minn., on April 3, 1964. Our class extends its sympathies to his family.

Gilbert V. Rohleder is the author of an article which appeared in the October, 1964 issue of Pipe Line Industry. Before joining his present firm, Mid-America Pipeline Company, as general superintendent in charge of operations and engineering in 1960, he was manager of operations and chief engineer for Okan Pipeline. Prior to this he was with Service Pipeline Company, and an officer in the U. S. Army. At present he is serving as a part time extension instructor for Oklahoma State University in engineering economy. . . . **Richard S. White,** a founder and now president of Automation Engineering Laboratory, Inc., of Stamford, Conn., was pictured and quoted in an article in the Bridgeport Sunday Post, October 25, 1964, concerning the 10th anniversary of the company. One of the oldest and largest firms of its kind, A.E.L. not only invents creative new solutions to manufacturing and packaging problems but also designs and builds actual equipment. Its slogan is

"Inventions Created To Order." Most of the firm's work is highly confidential, but it is known that A.E.L. has built automation systems for processing, packaging, and product handling in the candy, glass, paper, and electrical industries. The company, at the time of its 10th birthday, announced plans to double again within the next three years.

That's all for this month. How about taking pen and paper in hand and sending in some contributions to this column?—**Robert R. Mott,** Secretary, Kent School, Kent, Conn. 06757; **Richard V. Baum,** Assistant Secretary, 1718 E. Rancho Drive, Phoenix, Ariz.; **John T. Reid,** Assistant Secretary, 80 Renshaw Avenue, East Orange, N. J.

'49

"Well, we made it! Our books are closed and the reunion contributed 91 cents to our class treasury." So exults **Stan Margolin** in a statement accompanying the financial statement for our 15th Reunion. So we didn't make much money to keep the class going for the next five years, but we had a lot of fun. The mailings we sent out came to $209. The hats, canes, buttons, badges, balloons, prizes, decorations, placards, tickets, instruction packets, and other stuff you found when you got to the reunion came to $367.89. Overtime pay for the orchestra was $35. Souvenir beer mugs came to $216.46 and we still have some left. They make fine mantle decorations and if you want some (or one) send me $2.00 each plus 25 cents each for shipping costs and I'll send yours along. All in all, the reunion cost the class treasury $1,409.00 but you shelled out $1,409.91 so there's where our fat profit came from. . . . **Jim Berman** didn't come to the reunion but he sent along a questionnaire which goes like this: He lives in Port Chester, N.Y., with wife Peggy and sons Christopher, 9, and Andrew, 6¾ He has not changed weight since graduation, likes sailing and carpentry, has stopped smoking, spends three hours a week in community affairs. Question: How many push-ups can you do? Answer: God knows! How many people have you hired? A number. Fired? Ditto. Jim has held only one job since graduation, moved twice, visited six foreign countries, can't say how far he travels yearly on business because it varies considerably. He is an officer of the Raisler Corporation. We missed you at the reunion, Jim.

Don Botway lives in Westport, Conn., with his attractive wife Jacquelyn, and two lovely daughters Denise, 9, and Suzanne, 8, all of whom were at the reunion with him. He is president of his own company, Industry Liaison Services, and sales manager of Consolidated Diesel Electric Corporation. He has hired 20 people and fired none, has had seven jobs since graduation, visited eight countries, moved three times, and gained 10 pounds since graduation. He has not stopped smoking, is active in Community affairs, can do 10 push-ups, and likes golf and hunting. He describes himself politically as a Republican with top-level Democratic Party connections! . . . **Jabez "Stoney" Harford** and wife, Dora, live in Bayside, N.Y. Their daughters Andrea and Wendi are 12 and 8 respectively. Stoney is district sales engineer for the Niagara Blower Company, has held three jobs since graduation, visited two countries, moved twice, gained 10-12 pounds, and puts in 10 hours a week on community affairs. He spends his leisure time in photography, fishing, and skiing. . . . **Archie Harris** lives in Santa Ana, Calif., with his wife, Audrey and children Ken, 13, and Diane, 12. He has moved nine times, had ten jobs with four companies, hired 125 people and fired 11, and is presently chief of marketing planning for Autonetics in Anaheim, Calif. Athletically, Archie is a stand-out in any league. He has gained seven and one half ounces since graduation, excels at bridge and can do 11 push-ups. He is active in community affairs to which he devotes five hours a week.

It is with great sadness that I report the death last September 28 of **Dick Davidson,** at the age of 37 after a short illness at his home in Woodbridge, Conn. Dick was plant manager of M.B. Electronics Company in New Haven. In February of 1963, Dick was honored as Outstanding Young Man of the Year by the Hamden (Conn.) Junior Chamber of Commerce in recognition of his long and active service in Boy Scouting. Dick leaves his wife, Marcella Hubbard Davidson of Woodbridge, and two daughters, Marilyn and Jennifer. Dick was well-known and liked in our class and I am sure I speak for all in extending our deepest sympathy to his family—**Fletcher Eaton,** Secretary, 42 Perry Drive, Needham, Mass. 02192.

'51

It is rather interesting to watch the reports of classmates come in. Activities seem to run in cycles and this month's cycle indicated a good deal of technical proliferation by our class. The topic: papers presented. The winner, at least according to the sheer number of clips from our clipping service is **Mert Flemings.** Mert was chairman of the session on two phase solidification at the metals show this fall and spoke on the "Formation of Microporosity in Solidification." At still another session at the show, Mert was featured at a round table discussion on fluidity with the American Foundry Society and was also awarded the distinct honor by the AFS of being asked to present the Charles Edgar Hoyt Memorial Lecture at the Society's 68th Casting Congress in Atlantic City. Mert is an associate professor in the metallurgy department at M.I.T. and lives in Lexington, Mass., with his wife, Betty (Goodridge), and their two children Peter, 4, and Ann. 6. . . . **Marshall Alper** recently conducted a seminar for the M.I.T. Department of Aeronautics and Astronautics entitled "Ranger-7 Pictures of the Moon." Mickey is now back at Jet Propulsion Laboratory in Pasadena, Calif., as chief of the applied mechanics section, after having been on loan to NASA in Washington, D.C. I would love to discuss placing strain gages on the roof of Kresge Auditorium, Mickey, but I just don't know how to work it in. . . . Among the other seminar presentors: **George Field,** now of the Department of Astrophysical Sciences, Princeton University, spoke at Tech and his topic, "Quasers as Young Galaxies," sent me to the dictionary, in vain. Try it, but I hope that the rest of you non-physicist/astronomers have a better dictionary than I have.

Saverio Greco is with Socony Mobil Company in New York City as a senior engineer. His responsibility is the process design of petrochemical and refinery units. He was with the M. W. Kellogg Company prior to joining Socony Mobil, also in the field of design and startup of petrochemical units, and has been awarded two patents in the field of ethylene processing. All of this I garnered from a biographical note in a paper which he co-authored in the magazine, Hydrocarbon Processing & Petroleum Refiner. . . . The I.E.E.E. Transactions recently featured papers by two members of our class: **Murray Sirkis,** now an association professor of electrical engineering at the University of Illinois, and **Robert Sittler,** professor and co-director of the systems theory group at Case Institute of Technology. . . . **Robert Parker** now heads the Crystallization of Metals Section at the National Bureau of Standards. He has been a staff member at NBS since 1954. . . . Monsanto has recognized two of our graduate student classmates: **Ardashus Aykanian** and **Frank LaBelle,** both of whom received their S.M. in 1951. Ardashus has been appointed senior research specialist at Monsanto's Springfield, Mass., plant and Frank was appointed director of engineering design and construction at Monsanto's St. Louis Plant. . . . **Henry Hidalgo** has been appointed to the professional staff of the Institute for Defense Analysis (IDA). Henry, his wife, and their four children reside in Arlington, Va. . . . **Ed Stringham** is president of Penetryn System, Inc., Latham, N.Y., and was recently elected to membership in the Young Presidents' Organization. Qualifications for membership include being president of a sizeable company (defined by more than one million dollars in sales and more than 25 employees) before reaching the age of 40!

Marvin Baker is now living in San Pedro, Calif., and is manager of the Technological Department, Shell Chemical Company, Torrance Plant. He is also teaching a graduate course in chemical engineering kinetics on a part-time basis at the University of Southern California. . . . A report from **John Bergmann** has informed us that he is still with National Filter Corporation and is, in fact, now a director of that corporation. He is living in Paramus, N.J., but has been doing some extensive traveling to Europe and the Far East. His primary function is to develop complete processing plants for the food industry. . . . **Tom T.K. Biggs** has sent in the engineering news note of the year: from the TK Ranch in Coronation, Alberta, Canada, come the words:

"Eat more Beef", and the report is that the ranch, herd, and family are all growing as planned. What ever happened to all that metallurgy and thermo, Tom? . . . . **Christian Bolta,** his wife, Joy, and their four children (an even split: two and two), are living in Alexandria, Va. He is manager of the special projects group at Atlantic Research Corporation. His duties evolve around limited warfare studies and the effects of lightning on aircraft and rockets. . . . **George Boyden** is president of E.E. Specialists, Inc., a New England manufacturers' sales agency which caters to the electronics fields of complex test and instrumentation systems. He is living in Boxborough, Mass., with his wife and, "three beautiful daughters." (Does anyone in the class have three handsome sons that they would like to match up?) And I can't resist reiterating George's outside activities: baritone soloist with the Boston Intimate Opera Company, horticulturist, member of the New York State Fruit Testing Co-operative Association, and member of the American Rose Society.

Ed Bronstien was elected president of the Twin City (Minneapolis/St. Paul) M.I.T. Alumni Club, and **John Dowds** holds similar honors for the Oklahoma M.I.T. Club. . . . **Steve Eisen** has been appointed vice-president of Maurice Linder and Son, insurance brokers in New York City. Steve has qualified as a certified life underwriter (CLU). . . . **Fred Ezekial** has formed his own company to specialize in engineering consulting and product development in the field of electrohydraulic controls. Fred had been an assistant professor in the mechanical engineering department at Tech prior to forming F. D. Ezekial Company. He now lives in Waltham, Mass., with his wife, Bessie (Robinson), and their two children. . . . **John Hennessy, Jr.** is living in New York City with his family of six, five of whom are boys. John says that on probability alone at least one ought to be an engineer. John's own professional activities have included engineering some of the Institute's new buildings. . . . And not to be outdone, the **Ernest Holzmanns** are taking their six children (ages 2 to 12) to California where he will pursue doctoral studies at Stanford University under a National Science Foundation Graduate Fellowship. He is taking a leave of absence from G.E.'s electronics lab in Syracuse, N.Y. . . . Betty and **Ralph Romano** are in the running with five and, at last count, 7/9ths children. Ralph has been with Entwistle Manufacturing Corporation (Military Products Division), for 11 years and became a vice-president in 1962. . . . Let me close with a quote from a feature article in Toy and Hobby World. The article featured Kenner Products Company. . . . "The offices and plant of Kenner abound in educated gentry. And this includes the younger executives who play a vital role in the company's growth. **James Jeep Kuhn,** Vice-president of research and development, got his M.S. from M.I.T." Jeep also got his S.B. from M.I.T. with us, and he is now living in Cincinnati.—**Howard L. Levingston,** Secretary-Treasurer, 358 Emerson Road, Lexington, Mass. 02173; **Forest Monkman,** Assistant Secretary-Treasurer, Walworth, P.O. Box 758, Greensburg, Pa.

'52

Back again with some news, although returns haven't been too promising. I have a nice letter from **Phillip H. Smith** who writes that he has joined Copperweld Steel Company in Warren, Ohio, as assistant to the executive vice-president. . . . **Robert F. King** has been appointed by the Plychem Division of the Budd Company to the post of cast nylon department market development representative, having formerly been with Johnson and Johnson Company, filter division. . . . **Orville D. Page** has been named manager of engineering by Vitro Corporation of America at Silver Spring, Md., where his new responsibilities will be in strengthening Vitro's technical position in the telemetry field. . . . **Sheldon G. Thorpe** has been promoted to director of quality control at Baxter Laboratories, Inc. in Morton Grove, Ill., where he will be working with their line of pharmaceuticals, and other medical equipment. . . . Recent publications by '52ers include **Stanley E. Charm,** Department of Nutrition and Food Science, M.I.T., "The Determination of the Tensile Strength of Fluid Food Materials" in the Journal of Food Science and **Morris J. Levin,** Lincoln Lab, "Estimation of a System Pulse Transfer Function in the Presence of Noise" published in the I.E.E.E. Transactions on Automatic Control. . . . Dr. **Arnold H. Glaser** was elected corporate vice-president at a recent meeting of the board of directors of Allied Research Corporation. He is also president of the ARACON Geophysics Company division of Allied, devoted to research in the area of weather radar, cloud physics, satellite meteorology, and meteorological satellite operations. Dr. Glaser is noted as a pioneer in the field of satellite meteorology, having been responsible for the original design concepts of the TIROS series. . . . That's about all for now, as the mailbox is empty. Please take the pen in hand, and drop a note about what you are doing.—**Dana M. Ferguson,** Secretary, P.O. Box 233, Acton, Mass.

'53

Alan L. Friedman, VIII, has been technical director of Dynamics Research Corporation in Stoneham, Mass., since December of 1956. Al designed and analyzed techniques for improved navigation systems now operational on the Polaris submarine, and also developed optimum techniques for the operation of inertial navigators using both sampled and continuous information. Prior to affiliating with Dynamics Research, he was a staff member and later assistant chief electronics engineer for the Instrumentation Laboratory in Cambridge. Al recently published a paper in the I.E.E.E. Transactions and is active in consulting work. . . . **Roman Chapelsky,** IV, recently spoke on the subject "Art and Architecture" before the Cranford Creative Arts Group. Roman is a member of the Board of Governors of the M.I.T. Club of Northern New Jersey and is also a vice-president of the Central New Jersey Chapter of the New Jersey Society of Architects and a member of the Board of Standards and Appeals, Elizabeth, N.J. . . . **David L. Klepper,** VI, is currently with Bolt, Beranek and Newman. Inc., and is supervising the area of integrating sound amplification design systems with room acoustic systems. His assignments in general architectural acoustics have included the design of numerous concert halls, auditoriums, churches and exhibition halls. Prior to joining Bolt, Beranek and Newman, Inc., Dave was with the U.S. Army Audio Radio Section of the Psychological Warfare Board and with the Mystic Transformer Company.

The following are some of the more recent address changes of various members of our class. Dr. **Charles D. Buntschub,** VIII, 128 Hartwell Avenue, Lexington, Mass. 02173; **Alcon E. J. Gallagher,** III, 1809 Marin Avenue, Berkeley, Calif. 94707; **Robert S. Godfrey,** I, Duck Hill Road, Duxbury, Mass.; Dr. **Bruce B. Hanshaw,** XII-A, 5511 Massachusetts Avenue, Falls Church, Va. 22243; **Philip R. Johnson,** XV, 784 Indian Head Street, Hanson, Mass. 02341, **W. James Mast,** I, 240 McMillan Road, Grosse Pointe Farms 36, Mich.; **Richard A. Neitlich,** 56 Stephen Drive, Plainview, N.Y. 11803; **Gabriel G. Pitta,** VI, 20173 Rockport Way, Malibu, Calif.; **Jean-Pierre A. Radley,** XV, 1206 Central Park So., New York, N.Y. 10019; **Rodney L. Richardson,** Melville Road, R.D. #1, Hyde Park, N.Y. 12538; **Arthur W. Bostick,** XIX, 81 Goodrich Road, Glastonbury, Conn. . . . Could really use some lively news and would appreciate anything that would be of interest. If anyone gets into the Cambridge area, please give me a call.—**Norman R. Gardner,** Secretary, 100 Memorial Drive, Cambridge, Mass.

'54

And a Happy Groundhog to you. I trust he didn't see his shadow, for I, at least, have had enough of broken trees, failing electric power, and snow shovels. From The Tech we learned that the M.I.T. lightweight crew of 1954 had returned to appear as guests of the Richard's Cup Regatta. In 1954, as you will recall, the lights won the Sprint Championships and then went on to England and won the Thames Challenge Cup. Classmates on that crew who returned to row a few successful skirmishes (but not to make the proper weight) were cox **Jerry Waye, Larry Holmes, Leonard Gallagher,** and Captain **William McTigue.**

James B. Brook has been named as the Manager of the Aerojet-General Company office in Dayton, Ohio. In this position he is in charge of the firm's dealings with the Air Force at Wright-Patterson

and other facilities in that area. . . . High Fidelity magazine reported upon an amusing demonstration of perception conducted by **John D. Griffiths** a few years ago. It consisted of having listeners try to adjust bass control on two channels. They were able to do this, even though one bass control didn't affect the bass but rather increased distortion. . . . **J. Robert Peters** has recently been appointed factory controller of the Phillipsburg and West Eaton, N.J., plants of the Ingersoll-Rand Company. Bob was one of those few who received 3-2 degrees, his other one being from Ripon College. He has also added a 1960 master's in business from Stanford. . . . **John R. Radbill,** a technical specialist in the Space and Information Systems of North American Aviation in Downey, Calif., published a note on the analysis of boundary layers in the October, 1964, A.I.A.A. Journal. . . . Syracuse University was the site of a talk on computer-controlled radar for the real-time tracking of ballistic missiles given by **Kenneth E. Ralston,** who is with Lincoln Laboratory.

Surely one of the most interesting of our classmates' occupations is that of **Ralph E. Raynard, Jr.** Ralph is the president and owner of E. G. Washburne and Company of Danvers. The firm, founded in 1853, is a leading producer of weathervanes and other objects of early Americana. The weathervanes are handmade, mostly from nineteenth century molds. Some of the more interesting orders have been for a 7-foot eagle to replace a wooden one that formerly sat on the top of the State House in Concord, N.H.; a copy of the Mayflower, done from the original plans, for a church in Lansing, Mich., and a quarter horse for a man from Texas who stayed in the shop to advise on the proper shape of a quarter horse. . . . Mentioned in the Arizona Architect was **Paul D. Spreiregen** of Washington, D.C. Paul has written some 12 articles on urban design for the A.I.A. Journal and is the project head of the A.I.A. urban design committee. . . . A late report was received on a June, 1964, degree, this one a master's in civil engineering from the Polytechnical Institute of Brooklyn to **Paul Peter Valerio.**

News received concerning graduate students in our class included a report on a talk given by **Leonid V. Azaroff** of the Illinois Institute of Technology on "Soft X-ray Spectra of Transition Metal Alloys." It was given before a Metallury Colloquium at M.I.T. in November. . . . Col. **John G. Cleveland**'s son, Dixon, is now a member of the Class of 1968 at the Institute. . . . Forbes and Wallace has appointed **Roswell L. Derby** a vice-president. He had joined the firm earlier in the year as corporate director of personnel after resigning as director of personnel for William Filene's Sons in Boston. . . . **George E. Keeler,** formerly associated with a family company manufacturing hardware, has purchased the business of T. J. Edwards, Inc. . . . **Niranjan M. Parikh** was named in September as one of the ten oustanding young men in Chicago in 1964 by the Chicago Junior Chamber of Commerce. Later in September he was appointed assistant director of the metals and ceramic research division of L.I.T. Research Institute. . . . **Douglas T. Ross** published an article, "On Context and Ambiguity in Parsing," in the February issue of Commun. A.C.M. . . . **Frederick Sanders** is now a member of the Membership Commission of the American Meteorological Society.

In November your secretary spent a week visiting high schools in Tennessee and Arkansas. This was part of the Admissions Office's program to assist high school guidance counselors. Generally the talks consist of a discussion of educational trends in science, engineering, and related areas, etc. The formal period is then followed by questions. The audience is usually approximately 20 students selected by the guidance counselor because he feels they would benefit or are interested. Sometimes one talks to a mathematics or physics class. There are always exceptions and I have spoken to an entire school and before the 1,500 members of the junior and senior classes in one Negro High School in Memphis on this last trip. To supplement these visits the Institute utilizes the services of its graduates in the role of Educational Council Members, successors to the Honorary Secretaries by whom most of us were interviewed some 15 years ago. Classmates currently serving as Educational Council Members are Albert W. Bachelder, Bert B. Beals, John P. Bradshaw, Jr., Robert J. Byer, C. Jerould Carpenter, A. William Rouzie, Miguel A. Santalo, and Duane Yorke. . . . My postman assures me that with Christmas over, he would be pleased to keep my box filled with letters and notes from all of you—so for a happy postman, a smiling Secretary, and news-filled columns, please write.—**Bob Evans,** Secretary, 43 High Street, South Acton, Mass.

'55

The New Year means a lot of things to a lot of people. It gives each of us pause to consider where we have been, where we are now, and where we are going. The time spent in each tense depends quite a bit on one's age and one's attitude. To all of us, 1965 has a particular ring. It wasn't too long ago that we were all looking forward to 1955 and graduation. Now the slightly worn down twin fins on our beaver rings are a constant reminder that we are "responsible citizens" and not collegians anymore. Our thoughts turn to house, family, receding hairline, and protruding anterior. This year, however, we can additionally look forward to celebrating our 10th year out in the cold world at the Class of '55 Reunion in June. The reunion committee, under the chairmanship of **Glenn Jackson,** has planned a fun-packed weekend at the Provincetown Inn on Cape Cod. We hope that you are planning to attend, have indicated such on the questionnaire that was sent to you in November, and have sent in your class dues to help defray the organizational costs of this grand affair. Speaking of Glenn Jackson, it seems that he was so jealous of you married fellas at the fifth reunion that he felt he couldn't stand the strain of the forthcoming event sans spouse. He was married to Mary Anne Damon on September 19. Mary Anne, a native of Winchester, Mass., is a graduate of Middlebury College and has taught school in Westwood. Glenn is New England representative for Rohm and Haas, Philadelphia.

A number of questionnaires have already arrived bearing many interesting bits of information. If any of you in the Denver area need advice on how to invest your excess income(?), **Theo Otis** is a senior securities analyst at Financial Proggrams, Inc. . . . **Walt Shifrin** will tell you how to build a bridge across the Mississippi. He is an associate partner at Horner and Shifrin, Consulting Engineers, in St. Louis. Walt was married to Jennifer Tarleau on October 25 in Westport, Conn. Jennifer graduated from Vassar in 1963. . . . **William Deibel** is with the Marion, Ohio, Division of the Eaton Manufacturing Company, as a chief brake engineer. He is presently in charge of design and development of commercial vehicle brakes. The field is really "popp-in'," as Bill says, since there is considerable current legislation on requiring better braking performance on large trucks. Bill and wife Karel entered their 1932 Franklin in the Grand Classic meet at Indianapolis in July and took third place. Bill bought the car in 1953 from an old man in Belmont, Mass., for $175. He has put 4,000 on the vehicle, for a total of 197,000; we think we should dare him to drive it to the reunion and take bets on whether it will make 200 K. Bill is the only one so far to list his years of married life under Additional Education since 1955 in the questionnaire. . . . A lovely card was received announcing the birth of **Thomas Greenway Stockham,** 3d, on September 28. Tom, **2nd,** is a professor in the Electrical Engineering Department at M.I.T. and is living in Lexington. . . . **Roger Mackay** is in the Boston area with a small firm specializing in the engineering and erection of metal buildings. Roger and his wife have a new son and reside in Westwood. . . . **Pete Toohy** is now with the chemical division of the Shell Oil Company in Cincinnati. . . . **Dan Moore** is now in Washington, D.C. His particular specialty is the information system business, and he is with Booz, Allen and Hamilton Applied Research, a consultant organization. He has been over to Goddard a number of times and has run into **Norm Ness** and **Dave Lipke,** who are on the technical staff at the NASA Center. . . . We hope that you all had a happy New Year celebration and trust that your resolutions included making every effort to join us at the class reunion.—Co-secretaries: **Mrs. J. H. Venarde (Dell Lanier),** 2401 Brae Road, Wilmington, Del. 19803; **L. Dennis Shapiro,** Aerospace Research, Inc., 130 Lincoln Street, Boston, Mass.

'56

Paul Abrahams writes that he received his Ph.D. in mathematics from Tech in June, 1963. After working for Interna-

tional Telephone and Telegraph's Data and Information Systems Division, he has now joined the staff of Information International Inc. This is a small Cambridge based company specializing in research and development in computer sciences and Paul is starting a New York office. On a business trip to Systems Development Corporation of Santa Monica, Calif., Paul ran into **Clark Weissman** who has been doing some award winning work on a time-sharing system. . . . After a recent trip to the Midwest **Lloyd Beckett** reports that **Bill Horton,** his wife, and three sons reside just outside of Akron where Bill works for Goodrich Chemical. . . . **Bob Carlson** writes that he spent seven years in California, including four earning a Ph.D. from Stanford, but has now returned to the East to accept a position as assistant professor of finance at Columbia. . . . In a letter received last summer **Gerard Dorget** wrote that he has been with IBM since graduation. After a short training period in Poughkeepsie, he was transferred to the military division of IBM, France. In 1959 Gerard entered the French Army as a lieutenant in the Corps of Engineers and served in Algeria. Upon his discharge in 1962 he returned to IBM where he is now assistant to the manager of the components division. Gerard, his wife and son live just outside of Paris. . . . **Bill Layson** recently joined Pan American's guided missile range division after leaving the Lawrence Radiation Laboratory in Berkeley. . . . Just received a Christmas card from **Skip** and Wini **Luhrmann** with a short note that Skip is in his last year of medical school and they are enjoying New York.—**Bruce B. Bredehoft,** Secretary, 16 Mill Brook Road, Westwood, Mass. 02090.

'57

Al Drake sent in the following award-winning letter: "Your note in The Review on the lack of news hit home with me, since your envelope has been looking at me from my bulletin board for at least the better part of a year. If you will forgive the not altogether formal format of this communication, I shall attempt to help. The following items, unauthorized by those concerned, may be correct. If I make errors regarding some '57'ers, maybe they will write too. . . . **Chet Day** is with Bell Labs in Holmdel, N.J. He and his wife, Dee, have a son, Michael Scott, a very attractive home a stone's throw from Bell, and they are expecting a new Day any day now. Chet is active as a leader of a technical group and as a member of the Bell recruiting team—the latter activity recently brought him back to M.I.T. for a few days. He also teaches 6.073 at night to the co-ops at Bell. . . . **Les Gimpelson** is also at Bell in Holmdel, but I haven't seen him for quite a while. . . . **Phil Pearle** and his wife and daughter are living in Arlington. Phil did his doctoral work in Course VIII at M.I.T. and now teaches in the Physics Department at Harvard. His mastery of the sport of ping-pong is, alas, unimproved. . . . **Jim Conley,** after several years as a tycoon of industry, is finishing up his doctoral work in electrical engineering at Tech. . . . **Ed Friedman** got his doctorate in physics at Columbia and is an assistant professor of physics at Stevens Institute of Technology in Hoboken, N.J. . . . I saw **Pete Card** in the halls recently, he's doing graduate work in electrical engineering. . . . **Roger Appel** is at Adage, Inc. here. When I was in the Army at Fort Monmouth, I learned from a local tech representative that Roger is immersed in developing something called an ambilogical computer. . . . **Norman Tepley** and his wife Aviva Rubin, '58, have moved to Michigan. Norman doctorated in Course VIII at Tech and is on the faculty at Wayne State in Detroit. . . . **Ed Roberts** is, as everybody knows, on the faculty in XV and recently had an article in Science and Technology on how R and D contracts get contracted. His new book has been on display in the Coop. Think of all the things he could have done if he had stayed in electrical engineering! . . . **James D. Larson,** who was omitted from our yearbook, got, I believe, his doctorate in physics from Caltech and I would like to get in touch with him, if anybody knows how. . . . Via a long, diffuse and twisted grapevine, I learn that **Joe Roseman** is completing a doctorate in math in the New York City area and recently went off to a symposium in sunny Italy. . . . **Dick Kain** and his wife, Helen, are expecting the fourth Kain (parents included) and are living in Lexington. Dick is on the electrical engineering faculty and won the all-institute Goodwin Award for accomplishment in teaching in 1962. From their home, on a clear night, you can watch all the accidents on route 128. Helen, incidentally, has a doctorate from the place in Harvard Square. Dick's research is with project MAC at Technology Square. . . . Liz and I returned last June from two very interesting years in the Signal Corps at Fort Monmouth, N.J. I had an interesting and challenging research assignment; she did some consulting, and there are, I suspect, places more difficult to defend than Asbury Park, N.J. Liz is doctoral thesisizing and I'm back on the Electrical Engineering faculty, teaching probabilistic systems and doing noisy research on noisy Markov systems. . . . **Fred Morefield** has been doing a lot of work to get out his monthly report and I hope we will all help him a little more in the future." Many thanks, Al.

Two other brief notes: **Bill Salmon** has been named by the State Department Office of International Scientific Affairs to co-ordinate the department's activities on desalination. . . . Planning the reunion is bogged down here; still no news to report. That's all for now.—**Frederick Morefield,** Secretary, 1A Acorn Street, Boston, Mass. 02108.

'58

Although the holiday season is over as you read these notes, the Christmas spirit appears to have prompted several letters including this one from **Ed Jones;** "Returning to the East has been interesting in a number of respects, although the memory of life in California lingers. I finished my degree (Ph.D., Physics) at Berkeley and came to Princeton where I am currently finishing up the last few months of a National Science Foundation Postdoctoral Fellowship. Next semester I will become a member of the Princteon faculty as an instructor or research associate." Ed also sent along this information about other 1958 men . . . **Jim Mazo,** VIII, is on the faculty and research staff at the University of Indiana. . . . Down at the University of Pennsylvania, **Ira Gerstein** is on the faculty as well as doing research. . . . **Deane Raley,** XIV-B, is now with Time, Inc., in New York City, after a stint of graduate work at the University of Chicago. . . . On the international scene, **Vic Teplitz,** Course VIII, is at CERN in Geneva, Switzerland, on a NATO fellowship. He and his wife have recently written a paper together to be published in The Physical Review.

Our class continues to pursue advanced degrees in many areas. **Frank Weiser** received his Ph.D. in electrical engineering from Brooklyn Polytechnic Institute. . . . **Richard Yurman** is working towards a Ph.D. at Boston University after receiving an A.M. in English. . . . **Paul Busch** continues at Harvard where he is studying for a Ph.D. in environmental engineering (lots of raw material in that Harvard environment). . . . The National Bureau of Standards has awarded one of 20 Postdoctoral associateships to **Harvey Utech** for this academic year. He will continue at M.I.T. in metallurgy and study convection effects on solidification of aluminum crystals. . . . **William G. Klein** presented a technical paper "Mechanics of Fiber Drafting" at the A.S.M.E. Textile Engineering Conference at M.I.T. in October. . . . **Robert M. Rose,** now an associate professor of metallurgy at M.I.T., spoke on superconducting materials at the fall I.E.E.E. lectures.—**Michael Brose,** Secretary, 205 Pine Street, Tecumseh, Mich.; **Antonia D. Schuman,** Western Associate, 22400 Napa Street, Canoga Park, Calif.; **Kenneth J. Auer,** Midwestern Associate, 23105 Stonybrook Drive, North Olmsted, Ohio.

'59

It is with sorrow that I report the deaths of two of our classmates: **John Redmond** and **Charles Thornton.** John, a physics graduate who had been residing in Eureka, Calif., passed away last August; Charles, a mathematics major, died September 13 in Pittsburgh. He had just completed his studies for the doctorate at the University of Pittsburgh, and the degree was awarded posthumously a week later.

Before proceeding to more happy things, I think that a word of explanation is in order concerning the long delay in reporting the above news. A two-month wait is absolute minimum since, as an example, these notes were written

for a due date in mid-December. (The purpose of these remarks is two-fold since now, without appearing completely absurd, I can wish you a very Merry Christmas and a Happy New Year—which I didn't have the spirit to do in mid-October.) Allowing another month between the event and the writing gives three months, completely explained delay. As all M.I.T. graduates know, however, the real and the ideal rarely match, and this is the case here. With the exception of highly infrequent letters from you, my non-writing readers, these tidbits come either from news-clipping services which trickle material to the Alumni Association, or from my own inefficient scraping of the bottoms of the local barrels. Not only does this mean that you can expect to wait many moons for news, but also that most of the personal news will have all the human interest of a Business Week summary. It's up to you to make the notes interesting; The Tech taught me to fill the inches without worthwhile material. And now that my internal pressure has been relieved somewhat, we shall proceed.

Alan Barr has been teaching English at Wayne University, and now holds a Ph.D. in English literature from Rochester. . . . After receiving his Ph.D. from Case, **William Bassichis** traveled to Israel as a departmental guest of the Weizmann Institute of Science, where he says life is a "scholar's pilgrimage through 20th century science." He was amazed by the fact that "Israel has reached an ideal coexistence of capitalism and socialism. No one seems to find it odd that the two do exist side by side, that they both need each other." . . . **Larry Bishoff** has left his post as assistant to the Dean of Student Affairs at M.I.T. and has moved to assistant to the vice-president, operations and personnel. . . . **Michael Bottino** is an assistant professor at Old Dominion College in Virginia, and holds an M.I.T. doctorate in geology. . . . **Al Bufferd,** working at the New England Materials Lab in Bedford, has co-authored a paper on "Oxide Dispersion Strengthening of Cobalt-Base Alloys" which was presented at the Journees Internationales des Applications du Cobalt in Brussels last year. . . . **Calvin Campbell** is planning and supply co-ordinator of olefins and diolefins with Enjay Chemical Company. He was admitted to practice before the New York Bar last March. . . . **Edward Cheatham** is a technical writer editor with Sperry Gyroscope. On the basis of his studies for an M.A. in humanities at Hofstra, he recommends that Course XXI require a minimum of two years of language study. . . . **Robert Clark,** who intends to make the Air Force his career, writes in answer to a Course XXI questionnaire: "In the Air Force, and certainly in industry, the man with the best ideas doesn't always get a hearing; but the man with an ability to express his ideas does. I think M.I.T. should stress communication, especially oral communication, in its educational program. Today's engineer must be able to write, and speak intelligently to professional groups; regrettably, he does not now do so." Hear, Hear! . . . **Giles Dawson** is copy chief at Maslow, Gold & Rothschild in Boston.

Richard Desper and his wife are to be congratulated upon the birth of their first child, Elizabeth Anne, who checked in at 7 pounds, 13 ounces on Friday the Thirteenth in November. Who says it's bad luck? Dick writes that he's working on a doctoral thesis on crystal orientation in polyethylene at U. Mass., and expects to receive his degree within a year. Dick's very pleasant letter brings to two the total number of letters I have received for the Class News since taking office. . . . **George Glass** has been awarded a National Science Foundation postdoctoral fellowship for research in physics at CERN in Switzerland. . . . **Leon Glicksman** and **Richard Gurski** have been appointed assistant professors of mechanical engineering at M.I.T. . . . **George Heller** is a staff engineer with IBM in Bethesda, Md., doing information retrieval research. He is national education chairman and a member of the editorial board of the Association for Computing Machinery, and was recently nominated for the office of secretary.—**Glenn W. Zeiders, Jr.,** Secretary, 3 Rose Avenue, Watertown, Mass.

'60

Do you have your plans made for the reunion? Too early? Maybe, but it won't hurt to mark the dates on your calender. June 12 and 13 at Wentworth-by-the-Sea in Portsmouth, N.H. I'm sure you have heard from **Sue Schur** that the schedule of events for the weekend is shaping up rapidly. If you are planning to attend, or even if you are just thinking about it, or if you have some ideas for the program get in touch with our registration chairman, **Ray Harlan.** His address is 118 Decatur Avenue, Arlington, Mass. We are also asking that everyone help guarantee the success of the reunion by contributing $5 in class dues. The money can be mailed to Ray or to **Tom Farquhar,** Class Treasurer, 52 Mayo Road, Wellesley.

I received a letter from **Shel Epstein** which I will pass along: "I am in the process of packing and moving into a new house in Wilmette, Ill. I just came across an issue of Technology Review and decided that I better write now before I lose your address. A few days after I left the Institute in June, 1961, I married Suzanne Latt, Wellesley, '62, the sister of **Samuel Latt** of our class. Suzi and I moved to New York City where I got my LL.B. from Columbia University Law School while Suzi kept pace with a B.A. from Wellesley and an M.A. from Columbia University School of Graduate Faculties. We could not stay in New York for graduation exercises as we had to get back to Kenosha, Wis., to get our house fixed up for the arrival of our baby. Samuel Latt Epstein was born on the night of June 22, 1964, scarcely a day after we finished with the house. Within the last few weeks, I have been admitted to the bars of the State of Illinois and the U.S. Patent Office. I am now with the patent law firm of Silverman and Cass in Chicago. Suzi was admitted to the Graduate School of Northwestern University and is working for her Ph.D. in art history. **Ken Meyers** also practices law in Chicago with the firm of Ross, Hardies, O'Keefe, Babcock and McDougald. Our offices are only three blocks apart and we often eat lunch together. Ken and his wife, Sue, have a seven months' daughter, Lisa. **Samuel Latt** was graduated from Harvard Medical School in June and now is interning at Peter Bent Brigham Hospital. Sam graduated with honors for research on something. Sam's address is 24 Marion Street, Brookline, Mass. My new address is 624 Knox Avenue, Wilmette, Ill. I would like to hear from other alumni in Chicago. We look forward to seeing everyone at the reunion."—**John B. Stevenson,** Secretary, Partridgeville Road, Athol, Mass.

'61

A card and a letter lead off this month's column. **Ben Turetzky** writes, "Still working at TEXUS Research Center, Texas U.S. Chemical Company, Parsippany, N.J. Received master's degree in chemical engineering from Stevens Institute of Technology in June, 1964." . . . From **Alfred Crisi** we have the following very welcome contribution, "Since May, my wife, the former Barbara Stieglitz of Marblehead, Mass., and I have been living in Wiesbaden, Germany. I'm now assigned to the 2nd Weather Wing, director of technical services. It's a great place to be stationed. Ever since Barbara and I left M.I.T. in 1961, we have faithfully read Technology Review from cover to cover. Being overseas, we really appreciate the magazine and news from home." Thanks to you both for writing!

Joining **Tom Hastings** at Digital Equipment Corporation in Maynard, Mass., is **David A. Gross.** Formerly with Rodney Associates in New York City as a technical writer, he will serve at D.E.C. in the same capacity in the Technical Publications Department. . . . A $500 Eastman Kodak prize for excellence in either teaching or research (it doesn't say which) in chemistry was awarded to **F. Christopher Tahk,** who is at the University of Rochester.

Bill Lenoir married Elizabeth Frost of Brookline last July 4. That's, uh, that's Independence Day, isn't it? Living in comfortable semi-retirement in Lexington, Mass., are **Pete Gray, Dave Ness,** B. T. Tucker, '62, and Murray Sachs, '62. Pete is currently doing a little teaching and a lot of thesis work. With all other requirements for his degree out of the way, he expects to finish this year sometime. Dave, still in Course XV, is working on Project MAC (Multiple Access Computing. See Technology Review for June 1964, p. 24.) . . . **Ernie Rogers** was married last August to Debbie Giffin. They are spending two years in Liberia where Ernie is involved in an Agency for International Development project.—**Joseph Harrington 3rd,** Secretary, 22 Hidden Road, Andover, Mass. 01810.

'63

The Alumni Fund, entering its 25th year, has set a goal of $1.5 million and 45 per cent participation this year. This is a significant goal, $500,000 more than last year. Our part can be begun by increasing our own individual contributions by 50 per cent, which for most of us would still be zero. The hint is clear enough; and remember that all donations, unless otherwise designated, will go to the Class of 1963 Loan Fund. All gifts over $5 win a year's subscription to The Review. . . . The only class news received since last month is that **Don Snyder** published a paper on "Compensatory Manual Control Systems" in the I.E.E.E. Transactions on Human Factors in Electronics. . . . If you have any news at all, send a card.—**Bob Johnson,** Secretary, 11 Myrick Street, Allston, Mass.

'64

The backlog of news from members of the class is almost exhausted. Please send information about yourself and others in our class for future editions. **Ned Block** was awarded a Woodrow Wilson Fellowship and is doing grad work in philosophy at Oxford in England. . . . **Frank Carpenter** is studying for the ministry (Unitarian) at the U. of Chicago. . . . **Robert Colvin,** of St. Charles, Mo., is in med school at Harvard. . . . **Thomas Daniel** is serving in the Peace Corps. . . . **Dennis Deegan** is at M.I.T. in Course III grad school. . . . Major **Robert Derrickson** of Townsend, Del., is serving in the Air Force in Nebraska after receiving his Ph.D. in 1964. . . . **James Dorr** is studying at the U. of Indiana for his Ph.D. in English. . . . **John Eck** is at M.I.T. studying for his second S.B., this time in Course XVI. . . . **John Eulenberg** is in the grad school of Arts and Sciences at Harvard and is studying for a Ph.D. in linguistics. . . . **Maurice Finocchiaro** received honorable mention in the competition for the Woodrow Wilson Fellowship. He is now at Berkeley studying philosophy. . . . **David Freedman** is at the Simmons College School of Social Work. . . . **Wolde Ghiorghis** is in grad school at Lehigh U. working for a M.S. in electrical engineering. He plans to return afterwards to his native country of Ethiopia to teach. . . . **Larry Greenley** is working in philosophy at the U. of Iowa. . . . **Robert Hunter** has joined the consulting engineering firm of Homer A. Hunter Associates of Dallas. . . . Captain **William Johnson** of Chestertown, Ind., is serving in the Air Force at Scott AFB, Ill. He earned M.S. degrees in meterology, and aeronautics and astronautics. . . . **Richard Posner** is at M.I.T. in course VI grad school. . . . **Michael Stulbarg** of Cincinnati is in med school at Harvard. . . . **Ronald Williamson** is working in the computer field at M.I.T. . . . Please send me news!—**Ron Gilman,** Secretary, Dane Hall 204, Cambridge, Mass. 02138.

The Club Meeting Calendar

M.I.T. Alumni gatherings announced in time for listing in this issue of The Review will be as follows:

City	Date	Speakers	Secretary
Tulsa	Feb. 8	Donald F. Carpenter, '22	Alanson Chandler, '37
Cincinnati	Feb. 9	Fred G. Lehmann, '51	Frank G. Schmaltz, Jr., '59
Ft. Worth-Dallas	Feb. 10	Donald F. Carpenter, '22	John J. Freiberger, '45
Boston	Feb. 11	Richard L. Petritz	Bruce B. Bredehoft, '56
Richmond	Feb. 16	Donald F. Carpenter, '22	John H. Wright, '47
Worcester	Feb. 17	John D. C. Little, '48	Arnold A. Kramer, '52
Washington, D. C.	Feb. 17	Donald F. Carpenter, '22	Merlyn J. Block, '41
Charleston, W. Va.	Feb. 23	Donald F. Carpenter, '22	Daniel G. Hulett, '42
New York City	Feb. 25	Columbus O. Iselin	James Phinney
Pittsburgh	Mar. 1	Donald F. Carpenter, '22 and J. C. Wiesner	Eli I. Goodman, '50
Mexico City	Mar. 11-13	Charles H. Townes and Donald F. Carpenter, '22	Armando Santacruz-Baca, '54

Sloan Fellows

Philip E. Hogin, '54, was promoted from general manager, Central Region Western Electric Company, Inc., Chicago, Ill. to vice-president, manufacturing staff, Western Electric Company, Inc. in New York City. **Endre Endersen, Jr., '62,** who was formerly with the marketing department of Campbell Soup, Ltd., Toronto, Canada, is now assistant manager of Campbell Company's three Nebraska plants. He and his family will live in the Omaha area. **Russell A. Newell, '57,** was promoted from manager, Missile Support Programs, RCA, to chief engineer for Missile and Surface Radar Division of Defense Electronic Products of Radio Corporation of America. **Howard H. Kehrl, '60,** formerly divisional manager of quality control, Chevrolet Engineering Center, General Motors, is now assistant chief engineer, Oldsmobile Division, General Motors. **William S. Wheeler, '54,** who was vice-president, government-industry relations, Motorola, Inc., is now with Arthur D. Little, Inc., in Cambridge, Mass., as a senior staff member. **James C. Rendeiro, Jr., '63,** has been promoted from assistant to the president, Wagner Castings Company to factory manager, Wagner Castings Company, Decatur, Ill. **William E. Sehn, '58,** who was director of reliability, Fisher Body Division, General Motors, was made assistant chief engineer, Fisher Body Division, General Motors, Warren, Mich. **Roswell L. Derby, '54,** has been appointed a vice-president of Forbes and Wallace, Springfield, Mass. **Dura W. Sweeney, '63,** who was senior engineer, Development Laboratories of IBM, has been made Director of Education, Field Engineering Division, IBM. **Edward C. Nezbeda, '59,** and **William M. Zarkowsky, '58,** have both been made vice-presidents at Grumman Aircraft Corporation. Nezbeda is director of manufacturing and Zarkowsky is director of E-2A program. **David L. Pitt, '56,** who was general marketing supervisor in Boston, has been named northeast division accounting manager for N.E.T.&T.

Mexican Fiesta Guests Will Hear Dr. Townes

THE M.I.T. Club of Mexico City's annual fiesta will be March 11 to 13, with Provost Charles H. Townes, the 1964 Nobel laureate in physics, and Mrs. Townes as guests of honor. The fiesta will open with a luncheon on Thursday.

Members and guests of the club will visit the Museum of Anthropology, lunch at the museum, see handicrafters at work in the Home Fair, and wander through the city the next day. That evening Dr. Townes will lecture on the development of the maser. This lecture will be sponsored by the Avalon Foundation and the Mexican-North American Cultural Institute, and a reception will follow.

A guided tour to the recently excavated Teotihuacan archeological zone and newly restored pyramids has been arranged for the visitors on Saturday morning. The traditional "Noche Mexicana" will be that evening at the home of Sr. Don Federico H. Tamm in Chimalistac with participants in Mexican dress.

Reservations may be made by writing to Richard L. Bolin, '50, c/o Arthur D. Little de Mexico, S.A., Paso de la Reforma 116-804, Mexico D.F.

Club News

The Campaign Against Obsolescence in Education Is Theme for Two Meetings of the Rochester Club

November 21, the M.I.T. Club of Rochester and the City Club co-sponsored a luncheon address by James R. Killian, Jr., '26, at the Rochester Chamber of Commerce. Dr. Killian gave an account of "The Campaign Against Obsolescence in Education." The group attending saw films that demonstrated some of the new approaches to teaching developed by the Physical Sciences Study Committee and Educational Services, Inc. The films showed teaching methods and materials in mathematics, physics, chemistry, and social studies used in teaching children from kindergarten to the 12th grade.

This topic was an excellent preparation for the club's March 24 meeting when members of the Physical Sciences Study Committee and Educational Services, Inc., will come to the University of Rochester Faculty Club to discuss new teaching techniques with Rochester area educators. Principals, science department heads, mathematics and social studies teachers in addition to school board members representing over 30 schools will attend.

Following his address, Dr. Killian and Dean Pitré were guests of the M.I.T. Club at a cocktail party at the Genesee Valley Club. Local educators, businessmen, and civic leaders were invited to this meeting.

Club activities this season started with the annual steak roast and election of officers. Next came a joint meeting with the Buffalo-Niagara Falls chapter when W. A. Rodger spoke on reprocessing and disposal of radioactive wastes. On December 29, the traditional Christmas luncheon was held. Area undergraduates on vacation from classes at M.I.T. were invited to speak on their impressions of life at Tech to applicants and prospective students. Avery Ashdown, '24, and Ross Smith, '55, commented on recent changes at M.I.T. and the popularity of athletics.

Officers for 1964-1965 are: President, Gordon L. Calderwood, '27; President-elect, James K. Kittwitz, '42; Vice-president, William A. Pitbladdo, '31; Treasurer, Reynold A. Grammer, '47; Chairman, Educational Council, Harry E. Essley, Jr., '36; Executive Committee Members: Andrew C. Price, 3d, '50; Robert G. Bowie, '38; and John G. Hart, '61; Secretary, W. Blake Foster, '60; Assistant Secretary, L. David Sikes, '63.

21 Pennsylvania Alumni Visit Modern Iron Mine

A visit to the Grace Mine, Bethlehem Steel Company's new iron mine near Morgantown, Pa., on November 13, provided a fascinating plant tour for the M.I.T. Club of the Lehigh Valley. While not far from the historic Cornwall mine, the Grace Mine is as modern as the aerial magnetometer survey which determined its location. Alumni taking part in the trip, 21 in all, met at the mine office and dressed in special clothing complete with electric miner's lamps on the hard hats. They then entered the mine hoist and were lowered 2,200 feet to the lowest drift level. The drifts, horizontal tunnels, are in hard trap rock below the ore body. The ore is undercut by block-carving and caused to drop down through openings into the drift, where automatic loaders fill ore cars for rail haulage to the shaft, by which the ore is hoisted to the surface.

The trip continued through the concentrating plant, above ground, which was put into operation in 1961. Here the ore is crushed and concentrated in several stages of magnetic separation to a black flour of about 65 percent iron content. Then, as a sticky paste, it is rolled like snowballs into pellets and baked to suitable hardness for blast furnace feed.

Dinner was served, after the tour, at the mine management personnel's clubhouse, an attractive woodland cabin, and featured roast beef personally cooked over an outdoor fire by John Bingham, mine superintendent, assisted by Mrs. Bingham. Several of his associates and their wives also took part. By way of club business, D. J. Blickwede, '48, outlined the forthcoming season's activities. Elected for posts to be filled this year were F. W. Hammesfahr, '40, Secretary, and E. C. Finnegan, '51, Treasurer, both for two-year terms; J. D. Briggs, '42, and W. M. Post, '36, for three-year terms as members-at-large; and A. F. Gould. '38, and C. F. Springer, '52, as members-at-large to fill unexpired terms.—Frederick W. Hammesfahr, Secretary, 2260 Woodlark Circle, Bethlehem, Pa. 18017.

Los Angeles Club to Hear Dr. Killian in March

The annual meeting of the M.I.T. Club of Southern California was held January 19, at the Los Angeles Athletic Club.

On Monday, March 8, we have the honor of hearing Dr. James Killian, '26, who will be visiting Los Angeles. The Club anticipates a capacity turn-out; all efforts are being bent to make this an outstanding evening. For further information, please contact the Club Secretary.—Arthur Schwartz, Secretary, 144 South Camden Drive, Beverly Hills, Calif.

Western Pennsylvania Group Visits Westinghouse Center

At its meeting on December 7, the M.I.T. Club of Western Pennsylvania toured the Research and Development Center of Westinghouse Electric Corporation. After a steak dinner at the center dining room, John C. R. Kelly, Jr., Director of Materials Research (and a Carnegie Tech man), described the role of the center in basic and applied research in support of Westinghouse's broad range of services and manufactured products. Demonstrations of three typical research activities were presented, as follows: lasers, H. F. Ivey, '44; superconductivity, Martin S. Lubell, '54; and liquid crystals, J. L. Fergason. Three other Tech alumni who are associated with the center, Ernest P. Klipfel, '48, Kan Chen, '51, and Michael Weisskoff, '63, assisted as tour guides. The program was planned and arranged by Donald A. Roellke, '57.

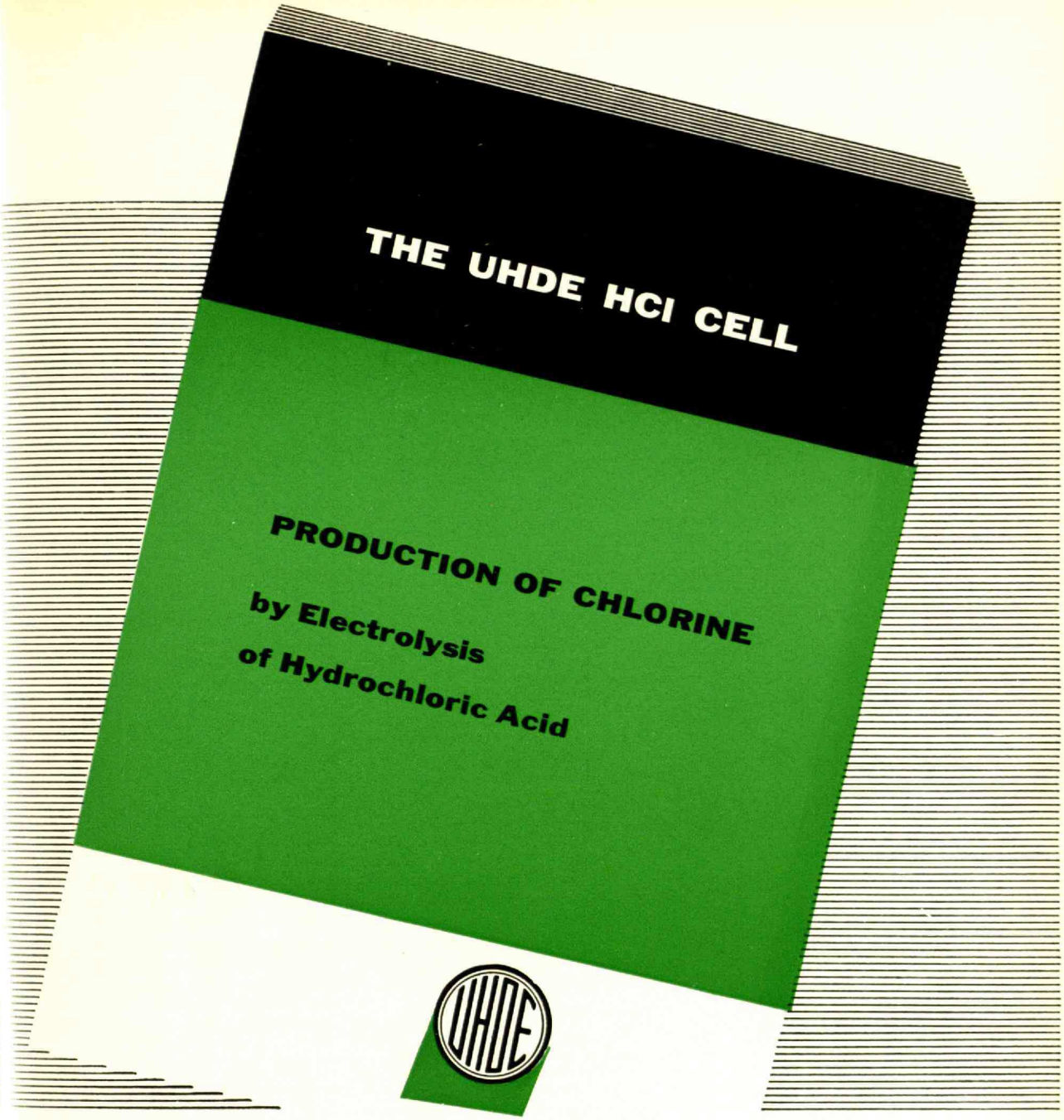
At its meeting January 18, the club returned to its usual meeting place, the University Club of Pittsburgh, for a dinner and discussion of M.I.T. admissions. In addition to two members of the M.I.T. Admissions Office, Pittsburgh Educational Counselors for M.I.T. were expected.

Two new club officers have been added: William M. Laird, '43, has accepted the responsibility of public relations chairman and Ward Powell, '46, is membership chairman.—Harry F. Raab, Jr., Assistant Secretary, 5053 Grove Road, Pittsburgh, Pa. 15236.

In Atlanta, Professor Mann Tells of Work for Blind

The M.I.T. Club of Atlanta had a pleasant and informative dinner meeting for members and their wives at the Cherokee Club on the evening of November 19. Robert W. Mann, Professor of Mechanical Engineering at M.I.T., gave an account of recent advances in the development of "Sensory Aids for the Blind." Of particular interest were the contributions made to these developments by freshmen at the Institute.

Accompanying Dr. Mann and guests at the meeting were Don Severance, '38, Executive Vice-president of the Alumni Association, and Ed G. Farrand, '21, from the south Georgia town of Leesburg. Others present were: Mr. and Mrs. James C. Bailey, '52, Mr. and Mrs. Earle E. Blount, '28, Mr. and Mrs. Fred N. Dickerman, '30, Raymond K. Flege, '32, Mr. and Mrs. Charles K. Holmes, '49, Mr. and Mrs. Edward D. Johnson, '56, Mr. and Mrs. Frederick, C. Johnson, '34, H. Clay Lewis, '37, Mr. and Mrs. B. H. Meyer, '42, Mr. and Mrs. Richard A. Miller, '56, Mr. and Mrs. C.P. Moore, '48, Mr. and Mrs. Robert Oppenlander, Jr., '44, Mr. and Mrs. Elmer E. Sanborn, '22, Mr. and Mrs. William T. Shuler, '38, Mr. and Mrs. William F. Spreen, Jr., '34, Mr. and Mrs. John P. Tillinghast, '31, Mr. and Mrs. Abner A. Towers, '39, and Brian P. Tunstall, '62. Atlanta alumni were saddened recently by the death of Harold W. Beers, '06.—Bernard H. Meyer, Secretary, Brookgreen Road, Atlanta, Ga.



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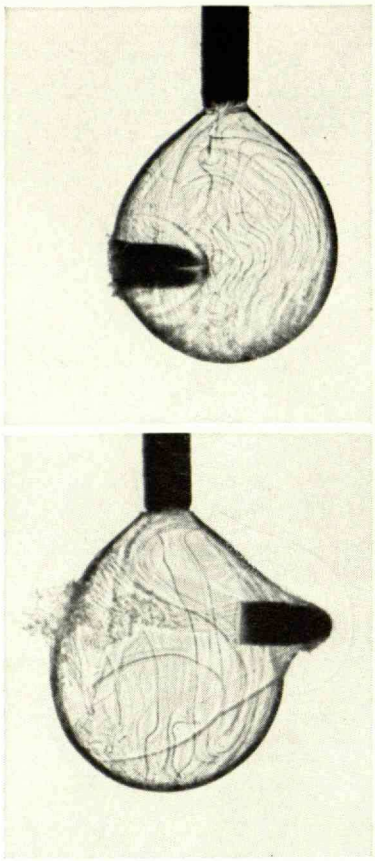

Shadowgraphs of a bullet passing through a soap bubble filled with Freon-12. A Strobotac with the reflector removed was used as a point source about three yards from the subject. Instead of a camera, a Polaroid 4 x 5 film back with Polaroid 3000 film was placed 3½ inches from the bubble on the opposite side of the light source. The flash was triggered by means of a microphone. Top photograph shows the bullet entering the bubble and the intensification of the shock wave in the Freon-12. Photograph at bottom shows another bullet leaving a bubble, with strong turbulence in its wake.

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